

10/578392

Document made available under the Patent Cooperation Treaty (PCT)

International application number: PCT/US2005/047411

International filing date: 29 December 2005 (29.12.2005)

Document type: Certified copy of priority document

Document details: Country/Office: US
Number: 60/640,966
Filing date: 31 December 2004 (31.12.2004)

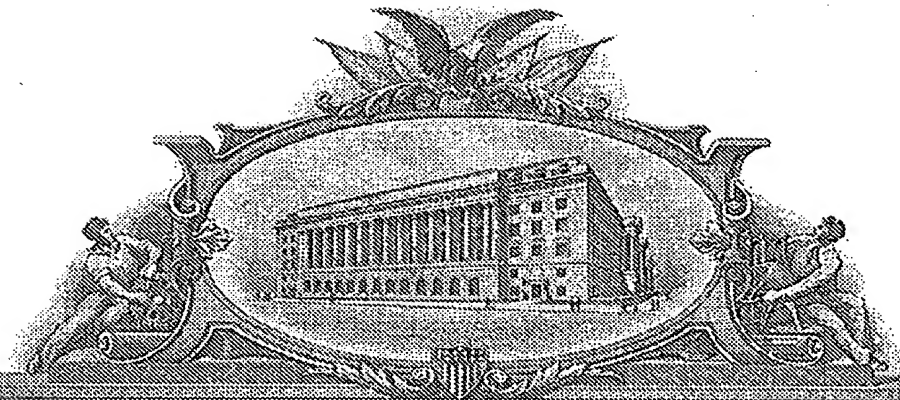
Date of receipt at the International Bureau: 07 April 2006 (07.04.2006)

Remark: Priority document submitted or transmitted to the International Bureau in compliance with Rule 17.1(a) or (b)



World Intellectual Property Organization (WIPO) - Geneva, Switzerland
Organisation Mondiale de la Propriété Intellectuelle (OMPI) - Genève, Suisse

1446826



THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

March 28, 2006

THIS IS TO CERTIFY THAT ANNEXED HERETO IS A TRUE COPY FROM THE RECORDS OF THE UNITED STATES PATENT AND TRADEMARK OFFICE OF THOSE PAPERS OF THE BELOW IDENTIFIED PATENT APPLICATION THAT MET THE REQUIREMENTS TO BE GRANTED A FILING DATE.

APPLICATION NUMBER: 60/640,966

FILING DATE: *December 31, 2004*

RELATED PCT APPLICATION NUMBER: *PCT/US05/47411*

THE COUNTRY CODE AND NUMBER OF YOUR PRIORITY APPLICATION, TO BE USED FOR FILING ABROAD UNDER THE PARIS CONVENTION, IS *US60/640,966*



Certified by

Under Secretary of Commerce
for Intellectual Property
and Director of the United States
Patent and Trademark Office

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

PTO/SB/16 (6/95) (Modified)
EXPRESS MAIL NO. EV 423269321 US

PROVISIONAL APPLICATION COVER SHEET

This is a request for filing a PROVISIONAL APPLICATION under 37 C.F.R. 1.53 (c)

123104	16558 U.S. PTO	Docket Number	SEQ-4095-PV	Type a plus sign (+) inside this box >	+
		Confirmation No.			
INVENTOR(s)/APPLICANT(s)					
Name (last, first, middle initial)			RESIDENCE (CITY, AND EITHER STATE OR FOREIGN COUNTRY)		
Mah, Steven Wrightson, Carolyn Kammerer, Stefan M. Nelson, Matthew R. Braun, Andreas Rencland, Rikard H.			San Diego, CA San Diego, CA San Diego, CA San Marcos, CA San Diego, CA San Diego, CA		
TITLE OF THE INVENTION (280 characters max)					
Methods for Identifying Risk of Low BMD and Treatments Thereof					
CORRESPONDENCE ADDRESS					
Correspondence Address associated with Customer No. 47328					
STATE		ZIP CODE		COUNTRY	
ENCLOSED APPLICATION PARTS (check all that apply)					
XXX	Specification	Number of Pages	330	Small Entity Statement	
XXX	Drawing(s)	Number of Sheets	5		
				XXX Other (specify)	Fee Transmittal (In duplicate - 1 page each) (2pgs); Form PTO 2038(1 pg); & Acknowledgement Postcard
METHOD OF PAYMENT (check one)					
XXX	Credit Card Form PTO 2038 enclosed (Provisional filing fees & extra page fees)			PROVISIONAL FILING FEE AMOUNT	\$725.00
The Commissioner is hereby authorized to charge the provisional application filing fee and any additional required fees or credit overpayment to Deposit Account Number:					

The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.
XXX No.

Yes, the name of the U.S. Government agency and the Government contract number are:

Respectfully submitted,

SIGNATURE 

Date December 31, 2004

TYPED OR PRINTED NAME Bruce D. Grant

REGISTRATION NO. 47,608

PROVISIONAL APPLICATION FILING ONLY

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re: **PROVISIONAL** Patent Application of: MAH, Steven, et al.

Title: **METHODS FOR IDENTIFYING RISK OF LOW BMD AND TREATMENTS
THEREOF**

Docket No.: SEQ-4095-PV

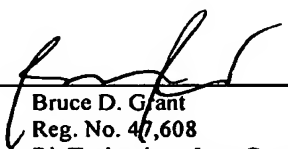
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

We are transmitting herewith the following attached items (as indicated with an "X"):

- ☒ A PROVISIONAL Patent Application comprising:
 - ☒ Specification (330 pages)
 - ☒ 5 Sheets of drawings
 - ☒ Form PTO-2038 for payment of \$725.00
- ☒ Provisional Application Cover Sheet (1 page)
- ☒ Fee Transmittal (In duplicate - 1 page each) (2 pages)
- ☒ Return postcard

Please contact the undersigned if there are any additional required fees or for crediting of an overpayment.

By: _____


Bruce D. Grant
Reg. No. 46,608
BioTechnology Law Group
658 Marsolan Avenue
Solana Beach, CA 92075
Telephone: (858) 623-9470
Facsimile: (858) 623-9476
Email: bruce@biotechnologylawgroup.com

"Express Mail" mailing label number: EV 423269321 US

Date of Deposit: December 31, 2004

This paper or fee is being deposited on the date indicated above with the United States Postal Service pursuant to 37 CFR 1.10, and is addressed to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Effective on 12/08/2004.
Fees pursuant to the Consolidated Appropriations Act, 2005 (H.R. 4818).

FEE TRANSMITTAL **For FY 2005**

☒ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT (\$) 725.00

Complete if Known

Application Number	TBA
Filing Date	December 31, 2004
First Named Inventor	Steven MAH, et.al
Examiner Name	NA
Art Unit	NA
Attorney Docket No.	SEQ-4095-PV

METHOD OF PAYMENT (check all that apply)

☐ Check ☒ Credit Card ☐ Money Order ☐ None ☐ Other (please identify): _____

☐ Deposit Account Deposit Account Number: _____ Deposit Account Name: _____

For the above-identified deposit account, the Director is hereby authorized to: (check all that apply)

☐ Charge fee(s) indicated below ☐ Charge fee(s) indicated below, except for the filing fee

☐ Charge any additional fee(s) or underpayments of fee(s) under 37 CFR 1.16 and 1.17 ☐ Credit any overpayments

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

FEE CALCULATION

1. BASIC FILING, SEARCH, AND EXAMINATION FEES

Application Type	FILING FEES		SEARCH FEES		EXAMINATION FEES		Fees Paid (\$)
	Fee (\$)	Small Entity Fee (\$)	Fee (\$)	Small Entity Fee (\$)	Fee (\$)	Small Entity Fee (\$)	
Utility	300	150	500	250	200	100	
Design	200	100	100	50	130	65	
Plant	200	100	300	150	160	80	
Reissue	300	150	500	250	600	300	
Provisional	200	100	0	0	0	0	100.00

2. EXCESS CLAIM FEES

Fee Description	Fee (\$)	Small Entity Fee (\$)
Each claim over 20 or, for Reissues, each claim over 20 and more than in the original patent	50	25
Each independent claim over 3 or, for Reissues, each independent claim more than in the original patent	200	100
Multiple dependent claims	360	180

Total Claims	Extra Claims	Fee (\$)	Fee Paid (\$)	Multiple Dependent Claims	Fee (\$)	Fee Paid (\$)
0 - 20 or HP =	0	x	25 =	0		0
HP = highest number of total claims paid for, if greater than 20						
Indep. Claims	Extra Claims	Fee (\$)	Fee Paid (\$)			
0 - 3 or HP =	0	x	100 =	0		0
HP = highest number of independent claims paid for, if greater than 3						

3. APPLICATION SIZE FEE

If the specification and drawings exceed 100 sheets of paper, the application size fee due is \$250 (\$125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

Total Sheets	Extra Sheets	Number of each additional 50 or fraction thereof	Fee (\$)	Fee Paid (\$)
335	- 100 =	235 / 50 = 5 (round up to a whole number)	x 125.00	= 625.00

4. OTHER FEE(S)

Non-English Specification, \$130 fee (no small entity discount)

Other: _____

SUBMITTED BY

Signature		Registration No. 47,608 (Attorney/Agent)	Telephone 858 623-9470
Name (Print/Type)	Bruce D. Grant		Date Dec. 31, 2004

This collection of information is required by 37 CFR 1.138. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

**METHODS FOR IDENTIFYING RISK OF LOW BMD AND TREATMENTS
THEREOF**

Field of the Invention

[0001] The invention relates to genetic methods for identifying susceptibility to low bone mineral density (BMD) and/or bone damage generally associated with human diseases, and in particular to osteoporosis, and treatments that specifically target the disease.

Background

[0002] Osteoporosis is a common disease characterized by low bone mineral density (BMD), deterioration of bone micro-architecture and increased risk of bone damage, such as fracture. Common types of osteoporosis include postmenopausal and senile osteoporosis, which generally occur later in life, e.g., 70+ years.

[0003] Osteoporosis is a major public health problem which affects quality of life and increases costs to health care providers. It is estimated that 44 million Americans and 100 million people worldwide are at risk for osteoporosis. In the United States today, 10 million individuals are estimated to already have the disease and almost 34 million more, or 55% of the people 50 years of age and older, have low bone mass, which puts them at increased risk of developing osteoporosis and related fractures. Of the 10 million Americans estimated to have osteoporosis, eight million are women and 2 million are men. These numbers are growing as the elderly population increases. It is estimated that by the middle of the next century the number of osteoporosis sufferers will double in the West, but may increase six-fold in Asia and South America. The estimated national direct expenditures (e.g., hospitals and nursing homes) for osteoporotic and associated fractures was \$17 billion in 2001 (\$47 million each day) - and the cost is rising (See National Osteoporosis Foundation; <http://www.nof.org/osteoporosis/stats.htm>).

[0004] Fracture is the most serious endpoint of osteoporosis, particularly fracture of the hip which affects up to 1.7 million people worldwide each year. One in two women and one in four men over age 50 will have an osteoporosis-related fracture in their lifetime. It is estimated that by the year 2050, the number of hip fractures worldwide will increase to over 6 million, as life expectancy and age of the population increase (See Spangler *et al.* "The Genetic Component of Osteoporosis Mini-review"; <http://www.csa.com.osteointro.html>).

[0005] Peak bone mass is mainly genetically determined, though dietary factors and physical activity can have positive effects. Peak bone mass occurs when skeletal growth ceases, after which time bone loss

starts. In contrast to the positive balance that occurs during growth, in osteoporosis, the resorbed cavity is not completely refilled by bone and BMD decreases. Based on studies of family histories, twin studies, and racial factors, some attribute 50-60% of total bone variation (*e.g.*, Bone Mineral Density) to genetic effects and suggest there may be a predisposition for osteoporosis.

[0006] Osteoporosis can be considered a complex genetic trait with variants of several genes underlying the genetic determination of the variability of the phenotype. Low BMD is an important risk factor for fractures, the clinically most relevant feature of osteoporosis. Segregation analysis in families has shown that BMD is under polygenic control. In addition, biochemical markers of bone turnover have shown to have strong genetic components. Several candidate genes have been analyzed in relation to BMD, but the most widely studied gene in this respect, the vitamin D receptor (VDR) gene, explains only a small part of the genetic effect on BMD. Numerous studies, focusing on the *BsmI* allele of the vitamin D receptor gene have concluded that absence of the restriction site correlates with low bone mineral density.

Summary

[0007] It has been discovered that certain polymorphic variations in human genomic DNA are associated with the occurrence of low bone mineral density (BMD) and/or bone damage generally associated with human diseases, and in particular to osteoporosis. In particular, polymorphic variants in loci containing *CETP*, *PROL4*, *GRID2*, *PDE4D* or *GPX3/TNIP1/TNIP1* regions in human genomic DNA have been associated with risk of low BMD.

[0008] Thus, featured herein are methods for identifying a subject at risk of low bone mineral density (BMD) and/or bone fracture, which indicates bone damage and related conditions such as osteoporosis in a subject. The methods comprise detecting the presence or absence of one or more of the polymorphic variations described herein in a human nucleic acid sample. In an embodiment, two or more polymorphic variations are detected and in some embodiments, 3 or more, or 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19 or 20 or more polymorphic variants are detected.

[0009] Also featured are nucleic acids that include one or more polymorphic variations associated with occurrence of low BMD, as well as polypeptides encoded by these nucleic acids. In addition, provided are methods for identifying candidate therapeutic molecules for osteoporosis and other low BMD-related disorders, as well as methods for treating osteoporosis in a subject by identifying a subject at risk of low BMD and treating the subject with a suitable prophylactic, treatment or therapeutic molecule.

[0010] Also provided are compositions comprising a cell from a subject suffering from low BMD or at risk of low BMD, and a *CETP*, *PROL4*, *GRID2*, *PDE4D* or *GPX3/TNIP1/TNIP1* nucleic acid, with a RNAi, siRNA, antisense DNA or RNA, or ribozyme nucleic acid designed from a *CETP*, *PROL4*, *GRID2*, *PDE4D* or *GPX3/TNIP1* nucleotide sequence, or a nucleic acid that hybridizes to such a nucleotide sequence under stringent conditions. In an embodiment, the RNAi, siRNA, antisense DNA or RNA, or ribozyme nucleic acid is designed from a *CETP*, *PROL4*, *GRID2*, *PDE4D* or *GPX3/TNIP1* nucleotide sequence that includes one or more low BMD associated polymorphic variations, and in some instances, specifically interacts with such a nucleotide sequence. Further, provided are arrays of nucleic acids bound to a solid surface, in which one or more nucleic acid molecules of the array have a *CETP*, *PROL4*, *GRID2*, *PDE4D* or *GPX3/TNIP1* nucleotide sequence, or a fragment or substantially identical nucleic acid thereof, or a complementary nucleic acid of the foregoing. Featured also are compositions comprising a cell from a subject having low BMD or at risk of low BMD and/or a *CETP*, *PROL4*, *GRID2*, *PDE4D* or *GPX3/TNIP1* polypeptide, with an antibody that specifically binds to the polypeptide. In an embodiment, the antibody specifically binds to an epitope in the polypeptide that includes a non-synonymous amino acid modification associated with low BMD (*e.g.*, results in an amino acid substitution in the encoded polypeptide associated with low BMD). In an embodiment, the antibody specifically binds to an epitope comprising an arginine corresponding to position 120 in a *PROL4* polypeptide (SEQ ID NO: 12).

Brief Description of the Drawings

[0011] Figures 1-4 show the position of each SNP in the chromosome on the x-axis, while the y-axis provides the negative logarithm of the p-value comparing the estimated allele frequency in the cases to that of the control group. Also shown in the figures are exons and introns of the genes in approximate chromosomal positions. More specifically, Figure 1 shows proximal SNPs in a *CETP* region in genomic DNA. Figure 2 shows proximal SNPs in a *PROL4* region in genomic DNA. Figure 3 shows proximal SNPs in a *GRID2* region in genomic DNA. Figure 4 shows proximal SNPs in a *PDE4D* region in genomic DNA. Figure 5 shows proximal SNPs in a *GPX3/TNIP1* region in genomic DNA.

Detailed Description

[0012] It has been discovered that polymorphic variants described in a *CETP*, *PROL4*, *GRID2*, *PDE4D* and *GPX3/TNIP1* loci in human genomic DNA are associated with occurrence of low BMD in subjects. Thus, detecting genetic determinants in and around this locus associated with an increased risk of low BMD occurrence can lead to early identification of a risk of low BMD, or its associated disorders

such as osteoporosis, and early application of preventative and treatment measures. Associating the polymorphic variants with low BMD also has provided new targets for diagnosing low BMD, for prognosing osteoporosis, and methods for screening molecules useful in osteoporosis treatments and osteoporosis preventatives.

[0013] Cholesteryl ester transfer protein (*CETP*) transfers cholesteryl esters between lipoproteins. The transfer of insoluble cholesteryl esters among lipoprotein particles (HDL to LDL) by *CETP* is a step in normal cholesterol homeostasis. The lipoprotein phenotype of *CETP* deficiency, which is characterized by increased levels of HDL and decreased levels of low density lipoprotein (LDL), appears to have antiatherogenic potential. Bone mineral density is reduced by atherogenic diets (increased LDL/HDL ratios), possibly as a result of a shift in the balance of bone marrow stromal cells away from osteoblasts and towards adipocytes, which could result in reduced bone synthesis during remodeling. Lipoproteins may directly regulate bone density via the LRP5, the low-density lipoprotein receptor related protein 5. LRP5 was cloned from an osteoblast cDNA library (Dong, *et al.*: *Biochem Biophys Res Commun.* 1998 Oct 29;251(3):784-90) and mouse knockouts show a reduced BMD phenotype (Kato *et al.*: *J Cell Biol.* 2002 Apr 15;157(2):303-14). A G171V mutation in LRP5 resulted in increased numbers of osteoblasts, increased AP activity, and increased trabecular number and thickness in mice (Babij *et al.*: *J Bone Miner Res.* 2003 Jun; 18(6): 960-74). The human G171V mutation was found to have the same phenotype, presumably by increasing WNT signaling in osteoblasts (Mao *et al.*: *Mol Cell.* 2001 Apr;7(4):801-9). Overall, there is evidence that lipoprotein profiles play a role in osteoblast differentiation. Provided is a method for treating osteoporosis or low bone mineral density by modulating a *CETP* function in a subject suffering from osteoporosis or low bone mineral density. *CETP* inhibitors and methods of making them are described in US 6,586,613 (Substituted tetrahydronaphthalene and analogous compounds); US 6,562,976 (4-phenyltetrahydroquinoline utilized as an inhibitor of the cholesterol ester transfer protein); US 6,387,929 (4-heteroaryl-tetrahydroquinolines and their use as inhibitors of the cholesterol-ester transfer protein); US 6,291,477 (Tetrahydroquinolines, processes for their preparation, pharmaceutical compositions containing them, and their use to prevent or treat hyperlipoproteinaemia); US 6,218,431 (Substituted biphenyls); US 6,207,671 (Cycloalkano-pyridines); US 6,127,383 (2-aryl-substituted pyridines); US 6,121,330 (5-Hydroxyalkyl substituted phenyls and their use in medicaments for the treatment of arteriosclerosis and hyperlipoproteinaemia); US 6,069,148 (Cycloalkano-pyridines); US 6,063,788 (Bicyclic-fused pyridines); US 5,932,587 (Heterocyclic-fused pyridines); US 5,925,645 (2-aryl-substituted pyridines); US 6,753,346 (*CETP* activity inhibitor); US 6,706,881 (Methods for preparing *CETP* inhibitors); US 6,689,897 (Intermediates of *CETP* inhibitors); US 6,600,045 (Methods for preparing *CETP* inhibitors); US 6,573,383 (Preparation of anhydrous *CETP*

inhibitor); US 6,555,113 (Modulation of cholesteryl ester transfer protein (CETP) activity); US 6,426,365 (CETP activity inhibitors); US 6,410,022 (Modulation of cholesteryl ester transfer protein (CETP) activity); US 6,410,020 (Monoclonal antibody reactive to human CETP and assay method for human CETP); US 6,140,474 (Monoclonal antibody reactive with human-origin CETP and method of quantifying human-origin CETP); US 5,948,435 (Methods of regulating CETP genes, enzymes and other compound, and pharmaceutical composition therefor); US 5,519,001 (CETP inhibitor polypeptide antibodies against the synthetic polypeptide and prophylactic and therapeutic anti-atherosclerosis treatments); and US 5,512,548 (CETP inhibitor polypeptide, antibodies against the synthetic polypeptide and prophylactic and therapeutic anti-atherosclerosis treatments).

[0014] *PROL4*, also known as Lacrimal proline rich protein (LPRP) is a member of the proline-rich secreted protein family and contains a conserved acidic N-terminal region. It has 45.5% amino acid homology to a salivary Parotid acidic protein (PRH1). PRH1 and related proline-rich (salivary) proteins act as potent inhibitors of hydroxyapatite crystal growth and bind calcium with a strength that suggests that they are important in maintaining the concentration of ionic calcium in saliva. The N-terminal region of salivary proline-rich proteins, which is also the region of strongest homology to *PROL4*, mediates this binding. It is expected that *PROL4* plays a role in maintaining calcium levels during bone remodeling, and that a loss of function of *PROL4* facilitates bone loss. Provided is a method of treating low BMD or osteoporosis by increasing expression of *PROL4* or otherwise increasing levels of active *PROL4* in a patient suffering from low BMD or osteoporosis.

[0015] Human glutamate receptor delta-2 (*GRID2*) is a member of the family of ionotropic glutamate receptors that are excitatory neurotransmitter receptors in mammalian brain. A point mutation in mouse *GRID2*, associated with the phenotype named "lurcher" in the heterozygous state, leads to ataxia resulting from selective, cell-autonomous apoptosis of cerebellar Purkinje cells during postnatal development. Mice homozygous for this mutation die shortly after birth from massive loss of mid- and hindbrain neurons during late embryogenesis. Glutamate receptors have been detected in osteoblasts and osteoclasts and may regulate bone resorption. Provided is a method of treating low bone mineral density or osteoporosis by modulating *GRID2* function in a patient suffering from low BMD or osteoporosis.

[0016] *PDE4D* encodes cyclic AMP-dependent phosphodiesterase 4D. Phosphodiesterases are a superfamily of enzymes involved in degradation of cyclic adenosine monophosphate (cAMP) and cyclic guanosine monophosphate (cGMP) (Manganiello VC, *et al.*: *Arch Biochem Biophys* 1995, 322(1):1-13; and Beavo JA: *Physiol Rev* 1995, 75(4):725-748). cAMP and cGMP are important second messengers participating in the response of various cells to hormones. In osteoblasts, cAMP produced in response to parathyroid hormone or prostaglandins regulates osteoblastic differentiation (Farndale RW, *et al.*

Biochem J 1988, 252(1):263-268; Kumegawa M, et al. *Calcif Tissue Int* 1984, 36(1):72-76; Ishizuya T, et al. *J Clin Invest* 1997, 99(12):2961-2970; and Partridge NC, et al. *J Cell Biochem* 1994, 55(3):321-327), which leads to increases in cancellous bone volume as indicated by experiments in animal models (Jee WS, et al. *Bone* 1987, 8(3):171-178; High WB: et al.. *Bone* 1987, 8(6):363-373; Reeve J: et al. *J Bone Miner Res* 1996, 11(4):440-445; and Finkelstein JS, et al. *N Engl J Med* 1994, 331(24):1618-1623). Intracellular levels of cAMP are regulated by G protein-coupled adenylyl cyclase (Casperson GF, Bourne HR: *Annu Rev Pharmacol Toxicol* 1987, 27:371-384), and degradation is mediated by the phosphodiesterases. The phosphodiesterase superfamily consists of seven families, PDE1-7, distinguished by substrate specificity, chromatographic behavior during purification, and affinity for biochemical activators and inhibitors. Of these, the PDE4 family is specific for cAMP and is selectively inhibited by rolipram. Four PDE4 genes, 4A, 4B, 4C, and 4D, have been cloned from rat and humans, all of which are predicted to have multiple protein products due to alternate splicing of RNAs. PDE4 inhibitors have been shown to increase bone formation in normal mice (Kinoshita T, et al. *Bone* 2000, 27(6):811-817) and to ameliorate loss of bone mass in animal models of osteopenia (Miyamoto K, et al. *Biochem Pharmacol* 1997, 54(5):613-617; and Waki Y, et al. *Jpn J Pharmacol* 1999, 79(4):477-483). PDE4A and PDE4D are expressed in two common mouse osteoblastic cell lines, ST2 and MC3T3-E1, that represent different stages in the osteoblast differentiation pathway (Wakabayashi S, et al.. *J Bone Miner Res* 2002, 17(2):249-256). PDE4 inhibition with rolipram increased BMP2-induced alkaline phosphatase activity, a marker of early osteoblast differentiation in ST2 cells. Furthermore, rolipram increased the expression of alkaline phosphatase, osteopontin, collagen type I and osteocalcin in the same osteoblast precursor cells (Wakabayashi S, et al. *J Bone Miner Res* 2002, 17(2):249-256). Provided is a method for treating osteoporosis or low bone mineral density by modulating a PDE4 function in a human suffering from osteoporosis or low bone mineral density.

[0017] SNP rs869975 is contained within the *GPX3* gene, and the *TNIP3* gene may not be ruled out due to linkage disequilibrium; therefore the *GPX3/TNIP3* region is considered associated with low BMD. The *GPX3* gene encodes the Plasma glutathione peroxidase 3 precursor. Glutathione peroxidase catalyzes the reduction of hydrogen peroxide, organic hydroperoxide, and lipid peroxides by reduced glutathione and functions in the protection of cells against oxidative damage. This enzyme, found mainly in the cytosol of mammalian cells, is unusual in its content of a selenocysteine residue in its active site that is encoded by a TGA opal codon. Selenium deficiency causes bone loss and might contribute to lower BMD. Osteoblasts produce glutathione peroxidase, possibly as a defense against hydrogen peroxide produced by osteoclasts during bone remodeling and thus may contribute to lower BMD. Provided is a

method for treating osteoporosis or low bone mineral density by modulating a *GPX* function in a human suffering from osteoporosis or low bone mineral density.

[0018] In the *TNIP1/NAF1/ABIN-1* pathway, *NAF1* was identified by a yeast two-hybrid screen as an interacting protein to the HIV protein, Nef. Subsequently, it was found to be an A20-binding protein that is critical for the A20-mediated negative feedback regulation of NF-kappa B activation in response to tumor necrosis factor (TNF). As TNF is a critical effector of the pathogenesis of rheumatoid arthritis (RA), Gallagher *et. al.* (*FEBS Lett.* 2003 Sep 11;551(1-3):8-12), tested TNF-alpha-modulated gene expression in cultured primary human synoviocytes *in vitro*. Genes upregulated included *TNIP1* and implicate *TNIP1* as a potential modulator of TNF-alpha bioactivity in RA. The differentiation and functions of osteoclasts are stimulated and regulated by osteoblast/stromal cell derived factors, such as receptor activator of NFkB ligand (RANKL). Provided is a method for treating osteoporosis or low bone mineral density by modulating a *TINIP* function in a human suffering from osteoporosis or low bone mineral density..

Low BMD and Sample Selection

[0019] The present invention is applicable to any disease in which low BMD and/or bone fracture is a factor, and is therefore particularly concerned with diseases such as osteoporosis. Low BMD is defined by the World Health Organization as 2.5 standard deviations below the age-matched mean of bone mineral density for a given population. Bone damage may be defined as any form of structural damage such as fractures or chips of the bone, and degradation or deterioration of the bone other than normal wear and tear resulting from low bone mineral density or another cause. Such low BMD and/or bone damage is associated with osteoporosis.

Osteoporosis, or porous bone, is a disease characterized by low bone mass and structural deterioration of bone tissue, leading to bone fragility and an increased susceptibility to fractures, especially of the hip, spine and wrist. In general, there are two types of osteoporosis: primary and secondary. Approximately 90% of all osteoporosis cases is idiopathic "primary osteoporosis". Such primary osteoporosis includes postmenopausal osteoporosis, age-associated osteoporosis (affecting a majority of individuals over the age of 70 to 80), and idiopathic osteoporosis affecting middle-aged and younger men and women. "Secondary osteoporosis" is the result of an identifiable disease process or agent.

[0020] For some osteoporotic individuals, the loss of bone tissue is sufficiently great so as to cause mechanical failure of the bone structure. Bone fractures often occur, for example, in the hip and spine of women suffering from postmenopausal osteoporosis. Kyphosis (abnormally increased curvature of the thoracic spine) may also result.

[0021] The mechanism of bone loss in osteoporotics is believed to involve an imbalance in the process of "bone remodeling". Bone remodeling occurs throughout life, renewing the skeleton and maintaining the strength of bone. This remodeling involves the erosion and filling of discrete sites on the surface of bones, by an organized group of cells called "basic multicellular units" or "BMUs". BMUs primarily consist of "osteoclasts", "osteoblasts", and their cellular precursors. In the remodeling cycle, bone is resorbed at the site of an "activated" BMU by an osteoclast, forming a resorption cavity. This cavity is then filled with bone by an osteoblast.

[0022] Normally, in adults, the remodeling cycle results in a small deficit in bone, due to incomplete filling of the resorption cavity. Thus, even in healthy adults, age-related bone loss occurs. However, in osteoporotics, there is an increase in the number of BMUs that are activated. This increased activation accelerates bone remodeling, resulting in abnormally high bone loss.

[0023] Preferred methods for the treatment of osteoporosis include an initial diagnostic step to determine the presence of the disorder. Initial diagnostic steps include determination of bone mass and rate of bone remodeling. The rate of bone remodeling can be determined by the measurement of biochemical markers. See, for example, Hui *et al.*, "The Contribution of Bone Loss to Postmenopausal Osteoporosis" *Osteoporosis Int.* 30 (1990). Diagnosis of those at risk of developing osteoporosis also allows more effective preventive measures. Part of diagnosis includes specialized tests called bone density tests that measure bone density in various sites of the body. Such methods include the measurement of the radiodensity of skeletal radiographs, quantitative computerized tomography, single energy photon absorptiometry, and dual-energy photon absorptiometry. Diagnostic techniques among those useful herein are described in W. A. Peck *et al.*, Physician's Resource Manual on Osteoporosis (1987), published by the National Osteoporosis Foundation. A bone density test can detect the presence of low BMD before a fracture occurs, predict your chances of fracturing in the future, determine rate of bone loss, and monitor response to treatment.

[0024] Based in part upon selection criteria set forth above, individuals having low BMD can be selected for genetic studies. Also, individuals having a family history of low BMD or diagnosed with osteoporosis often are selected for genetic studies. Other selection criteria can include: a tissue or fluid sample derived from an individual characterized as Caucasian; sample derived from an individual of Caucasian paternal and maternal descent; case samples derived from individuals diagnosed with osteoporosis; control samples derived from individuals with normal or high BMD levels and no family history of osteoporosis; and sufficient genomic DNA for all allelotyping and genotyping reactions performed during the study. Phenotype information may included pre- or post-menopausal, familial predisposition, country or origin of mother and father, diagnosis with osteoporosis (date of primary

diagnosis, age of individual as of primary diagnosis, osteoporosis-related fracture), biochemical measurements of markers of bone resorption (bone-specific alkaline phosphatase, urinary C-telopeptide of type I collagen, serum osteocalcin), current medication status (thyroid medication, hormone replacement therapy, steroid usage, bisphosphonates and cytotoxic agents for rheumatic diseases). Samples that meet the inclusion criteria and do not meet the exclusion criteria may be added to appropriate pools based on gender and disease status.

Polymorphic Variants Associated with Low BMD

[0025] A genetic analysis provided herein linked low BMD with polymorphic variant nucleic acid sequences in the human genome. As used herein, the term “polymorphic site” refers to a region in a nucleic acid at which two or more alternative nucleotide sequences are observed in a significant number of nucleic acid samples from a population of individuals. A polymorphic site may be a nucleotide sequence of two or more nucleotides, an inserted nucleotide or nucleotide sequence, a deleted nucleotide or nucleotide sequence, or a microsatellite, for example. A polymorphic site that is two or more nucleotides in length may be 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15 or more, 20 or more, 30 or more, 50 or more, 75 or more, 100 or more, 500 or more, or about 1000 nucleotides in length, where all or some of the nucleotide sequences differ within the region. A polymorphic site is often one nucleotide in length, which is referred to herein as a “single nucleotide polymorphism” or a “SNP.”

[0026] Where there are two, three, or four alternative nucleotide sequences at a polymorphic site, each nucleotide sequence is referred to as a “polymorphic variant” or “nucleic acid variant.” Where two polymorphic variants exist, for example, the polymorphic variant represented in a minority of samples from a population is sometimes referred to as a “minor allele” and the polymorphic variant that is more prevalently represented is sometimes referred to as a “major allele.” Many organisms possess a copy of each chromosome (*e.g.*, humans), and those individuals who possess two major alleles or two minor alleles are often referred to as being “homozygous” with respect to the polymorphism, and those individuals who possess one major allele and one minor allele are normally referred to as being “heterozygous” with respect to the polymorphism. Individuals who are homozygous with respect to one allele are sometimes predisposed to a different phenotype as compared to individuals who are heterozygous or homozygous with respect to another allele.

[0027] In genetic analysis that associate polymorphic variants with low BMD, samples from individuals having low BMD and individuals not having low BMD often are allelotyped and/or genotyped. The term “allelotype” as used herein refers to a process for determining the allele frequency for a polymorphic variant in pooled DNA samples from cases and controls. By pooling DNA from each

group, an allele frequency for each SNP in each group is calculated. These allele frequencies are then compared to one another. The term “genotyped” as used herein refers to a process for determining a genotype of one or more individuals, where a “genotype” is a representation of one or more polymorphic variants in a population.

[0028] A genotype or polymorphic variant may be expressed in terms of a “haplotype,” which as used herein refers to two or more polymorphic variants occurring within genomic DNA in a group of individuals within a population. For example, two SNPs may exist within a gene where each SNP position includes a cytosine variation and an adenine variation. Certain individuals in a population may carry one allele (heterozygous) or two alleles (homozygous) having the gene with a cytosine at each SNP position. As the two cytosines corresponding to each SNP in the gene travel together on one or both alleles in these individuals, the individuals can be characterized as having a cytosine/cytosine haplotype with respect to the two SNPs in the gene.

[0029] As used herein, the term “phenotype” refers to a trait which can be compared between individuals, such as presence or absence of a condition, a visually observable difference in appearance between individuals, metabolic variations, physiological variations, variations in the function of biological molecules, and the like. An example of a phenotype is occurrence of low BMD or clinically diagnosed osteoporosis.

[0030] Researchers sometimes report a polymorphic variant in a database without determining whether the variant is represented in a significant fraction of a population. Because a subset of these reported polymorphic variants are not represented in a statistically significant portion of the population, some of them are sequencing errors and/or not biologically relevant. Thus, it is often not known whether a reported polymorphic variant is statistically significant or biologically relevant until the presence of the variant is detected in a population of individuals and the frequency of the variant is determined. Methods for detecting a polymorphic variant in a population are described herein, specifically in Example 2. A polymorphic variant is statistically significant and often biologically relevant if it is represented in 5% or more of a population, sometimes 10% or more, 15% or more, or 20% or more of a population, and often 25% or more, 30% or more, 35% or more, 40% or more, 45% or more, or 50% or more of a population.

[0031] A polymorphic variant may be detected on either or both strands of a double-stranded nucleic acid. Also, a polymorphic variant may be located within an intron or exon of a gene or within a portion of a regulatory region such as a promoter, a 5' untranslated region (UTR), a 3' UTR, and in DNA (*e.g.*, genomic DNA (gDNA) and complementary DNA (cDNA)), RNA (*e.g.*, mRNA, tRNA, and rRNA), or a polypeptide. Polymorphic variations may or may not result in detectable differences in gene expression, polypeptide structure, or polypeptide function.

[0032] It was determined that polymorphic variations associated with an increased risk of low BMD existed in *CETP*, *PROL4*, *GRID2*, *PDE4D* and *GPX3* nucleotide sequences. In the *CETP* locus, polymorphic variants at positions selected from the group consisting of rs7500979, rs2217332, rs8044804, rs2270835, rs2133783, rs247609, rs952440, rs881598, rs2291955, rs2518054, rs866038, rs1436425, rs173537, rs247611, rs166017, rs173538, rs193694, rs7205692, rs8048746, rs247618, rs183130, rs6499863, rs4783961, rs3816117, rs711752, rs708272, rs1864163, rs4369653, rs1864165, rs891141, rs891143, rs7205804, rs5885, rs1532625, rs1532624, rs289712, rs7499892, rs5883, rs289714, rs158480, rs289717, rs4344729, rs289718, rs289719, rs2033254, rs4784744, rs291044, rs8053613, rs5881, rs5880, rs7198026, rs5882, rs8045701, rs289741, rs1801706, rs289742, rs289743, rs289746, rs172337, rs289747, rs1566439, rs7205459, rs289749, rs289751, rs8059220, rs8058353, rs289735, rs289737, rs291042, rs1875236, rs821466, rs821465, rs4275846, rs289707, rs821463, rs289706, rs1167741, rs2052880, rs1167742, rs1183256, rs1651665, rs1651666, rs4784751, rs1651667, rs8052091, rs1684574, rs1684575, rs1672865, rs821470, rs1549669, rs291040 and rs289754 were tested for association with low BMD. Polymorphic variants at the following positions were associated with low BMD: rs166017, rs193694, rs7205804, rs1801706, rs7205459 and rs821465. At these positions in SEQ ID NO:1, a thymine at position 14328, a thymine at position 14996, a guanine at position 37336, a guanine at position 50109, a thymine at position 57618, and a guanine at position 68805 were associated with low BMD.

[0033] In the *PROL4* locus, polymorphic variants at positions selected from the group consisting of rs523051, rs693620, rs2588349, rs2588350, rs619381, rs3759252, rs3759251, rs2418107, rs7303054, rs1838345, rs620878, rs2537817, rs1548803, rs667123, rs1838346, rs2159903, rs3944035, rs3741845, rs2110096, rs759055, rs589377, rs7960194, rs7978242, rs601051, rs4262797, rs2215714, rs1373434, rs2215715, rs612456, rs612808, rs689118, rs597468, rs592864, rs640372, rs7966559, rs654834, rs4763216, rs668521, rs669503, rs3906864, rs3906863, rs7957888, rs9300230, rs7306214, rs763839, rs2418105, rs666841, rs3851578, rs7138797, rs7295252, rs2418106, rs7299578, rs621112, rs3863320, rs1373432, rs1047699, rs1063193, rs2232959, rs2227296, rs1548804, rs2232958, rs2232957, rs2232956, rs1972571, rs3759250, rs3759249, rs1541525, rs2098248, rs2900550, rs7302130, rs4763583, rs4360778, rs1607695, rs1607694, rs2192139, rs7978300, rs7397871, rs4763217, rs2159900, rs10772370, rs7398682, rs2900551, rs2900552, rs2418214, rs2418215, rs965243, rs1117548, rs1520225, rs1520226, rs1520227, rs971919, rs2159901, rs2159902, rs2110099, rs7314847, rs7296003, rs4281556, rs4763219, rs3851579, rs3851580, rs1049119, rs2298866, rs2298865, rs2298864, rs2298863, rs3180393, rs2070837, rs7956204, rs2418216, rs3741844, rs4262798, rs2418217, rs2418218, rs7137492, rs2110100, rs1013312, rs4579993, rs1013313, rs7397106, rs2215716, rs2192140, rs4763589, rs1468697, rs2070837, rs3180393

and rs2298865 were tested for association with low BMD. Polymorphic variants at the following positions were associated with an increased risk of low BMD: rs2588350, rs619381, rs620878, rs759055, rs4262797, rs612808, rs3906863, rs7957888, rs763839, rs2418105, rs666841, rs3851578, rs7299578, rs621112, rs1047699, rs1548804, rs2232956, rs1520227 and rs2215716. At these positions in SEQ ID NO:2, a cytosine at position 2424, a cytosine at position 3625, a guanine at position 7097, an adenine at position 15688, a guanine at position 22861, a cytosine at position 24138, a cytosine at position 32459, an adenine at position 35151, a guanine at position 36930, an adenine at position 37490, a cytosine at position 38432, an adenine at position 38688, a guanine at position 42665, an adenine at position 43038, a cytosine at position 49075, an adenine at position 50773, an adenine at position 52107, a cytosine at position 75246, and a guanine at position 93715 were associated with risk of low BMD.

[0034] In the *GRID2* locus, polymorphic variants at positions selected from the group consisting of rs1433661, rs1485009, rs7681947, rs1816432, rs1485018, rs1485017, rs7438397, rs6834311, rs1368717, rs1017391, rs2870701, rs7679839, rs1385404, rs1368716, rs4693316, rs1905707, rs1905708, rs1905709, rs3912442, rs2082553, rs6831638, rs5860329, rs2870702, rs2870703, rs1948016, rs6835836, rs1994253, rs1905710, rs1485019, rs978191, rs1385405, rs7694361, rs1905711, rs1905734, rs1485012, rs1485013, rs4692981, rs7670552, rs7670932, rs7688091, rs7440540, rs2171000, rs2870704, rs7655758, rs7661436, rs7662289, rs7667044, rs7691929, rs5860330, rs901013, rs901012, rs901011, rs1948018, rs2870705, rs1948017, rs1905733, rs1385408, rs1385409, rs1385410, rs1485026, rs1485027, rs2904483, rs1385406, rs1905732, rs2046418, rs2200377, rs1905731, rs1905730, rs975713, rs6820985, rs7670441, rs6810794, rs7676623, rs1154861, rs1032125, rs1485022, rs1485024, rs3913651, rs4693319, rs1872383, rs2200376, rs7668090, rs7692930, rs967096, rs6822249, rs6532405, rs1017897, rs7672674, rs7694568, rs2904484, rs7340830, rs1485033, rs2870706, rs1905729, rs4693320, rs6848749, rs6532406, rs6532407, rs1905728, rs6819866, rs1905727, rs7674069, rs1905724, rs1905723, rs1485020 and rs6814101 were tested for association with low BMD. Polymorphic variants at the following positions were associated with an increased risk of low BMD: rs1433661, rs7679839, rs1368716, rs1905707, rs1905708, rs1994253, rs1485019, rs1905734, rs1485012, rs7670552, rs7691929, rs1948018, rs1948017, rs1485024, rs7694568, rs4693320, rs6848749, rs6532406, rs6532407 and rs6819866. At these positions in SEQ ID NO:3, a thymine at position 206, a guanine at position 8612, an adenine at position 9285, a thymine at position 11866, a guanine at position 11958, a cytosine at position 28773, a thymine at position 29876, a cytosine at position 35588, a guanine at position 37663, a thymine at position 39375, a cytosine at position 43705, an adenine at position 48962, a cytosine at position 49110, an adenine at position 65050, a cytosine at position 78331, a thymine at position 85405, a guanine at position 86441, an adenine at position 86967, a cytosine at position 87121, and an adenine at position 90969 were associated with risk of low BMD.

[0035] In the *PDE4D* locus, polymorphic variants at positions selected from the group consisting of rs6886495, rs6450498, rs1472456, rs4700315, rs4700316, rs7714708, rs7710479, rs2968013, rs2968014, rs2968015, rs1391648, rs2055297, rs2055296, rs3989138, rs4700317, rs2036220, rs7727206, rs7723432, rs1546221, rs4479801, rs4395595, rs4395596, rs4699932, rs2936201, rs7356672, rs2936200, rs1909296, rs7703131, rs7445308, rs3087748, rs4321723, rs2968016, rs5868151, rs1874858, rs1874857, rs7712922, rs4631140, rs4469166, rs1078369, rs1078368, rs2968006, rs2968005, rs2936190, rs2409613, rs4415048, rs2968004, rs2968003, rs2968002, rs2936191, rs1498610, rs6874662, rs3060393, rs7729722, rs7733884, rs7714489, rs7735570, rs2936193, rs2291851, rs2291852, rs1498602, rs1995166, rs1498603, rs1498604, rs1498605, rs1948651, rs4699934, rs4700319, rs2279737, rs7720361, rs7706419, rs1006431, rs1353747, rs1498606, rs1353748, rs1553113, rs2968012, rs2968011, rs1498608, rs2936189, rs1498609, rs2968019, rs6891238, rs2968010, rs2968009, rs2936203, rs1498601, rs1498600, rs1498599, rs2936202, rs7730070, rs6450501, rs6450502, rs6889456, rs6894618, rs7706044, rs7707541, rs7712076, rs6892860, rs6867053, rs7737269, rs6864156, rs950447, rs2936196, rs7719347, rs1391649, rs1391650, rs1391651, rs1353749, rs10682149, rs5868153, rs1363882, rs2409626, rs2968018, rs954740, rs986067, rs6869400, and rs5010782 were tested for association with low BMD. Polymorphic variants at the following positions were associated with an increased risk of low BMD: rs7714708, rs1498602, rs4699934, rs1006431, rs1353747, rs1498608, rs1498609, rs2968010, rs2936202 and rs1391649. At these positions in SEQ ID NO:4, an adenine at position 1599, a cytosine at position 39626, a thymine at position 40356, a thymine at position 43555, a thymine at position 44066, a thymine at position 49652, a cytosine at position 51103, an adenine at position 57173, a guanine at position 63980, and an adenine at position 82591 were associated with risk of low BMD.

[0036] In the *GPX3/TNIP1* locus, polymorphic variants at positions selected from the group consisting of rs1478398, rs1478397, rs1160114, rs1160113, rs1382323, rs1160112, rs7709870, rs7710643, rs7730467, rs6579829, rs6579830, rs6579831, rs6896232, rs1351131, rs1038074, rs1478396, rs6880512, rs4958858, rs4958431, rs4958432, rs6898463, rs4958859, rs4130064, rs4130065, rs4133119, rs4958860, rs4958861, rs4437356, rs4958868, rs1478400, rs6889375, rs1600159, rs6875892, rs4608909, rs2345000, rs4516840, rs2054440, rs707141, rs707142, rs841236, rs707143, rs707144, rs6869405, rs707145, rs707146, rs707148, rs707150, rs5872184, rs3763015, rs2042235, rs3763013, rs2042236, rs1946234, rs1946235, rs1946236, rs8177402, rs8177403, rs8177404, rs8177405, rs8177406, rs8177407, rs8177408, rs8177409, rs6888961, rs8177410, rs8177411, rs8177412, rs8177413, rs870407, rs870406, rs6873202, rs8177414, rs8177415, rs3805435, rs8177416, rs3792799, rs3792798, rs3828599, rs8177417, rs3792797, rs8177418, rs8177419, rs8177420, rs8177421, rs4958872, rs3792796, rs8177422, rs8177423, rs4958434, rs8177424, rs8177425, rs8177426, rs8177427, rs8177429, rs6889737, rs3792795, rs8177430,

rs8177431, rs4958873, rs8177432, rs8177433, rs8177434, rs8177435, rs3763011, rs8177436, rs8177437, rs4958874, rs8177439, rs8177440, rs8177441, rs8177442, rs8177443, rs869975, rs869976, rs8177444, rs8177445, rs7721469, rs8177446, rs7704191, rs8177447, rs11548, rs2230303, rs7722386, rs8177448, rs8177449, rs2070593, rs8177450, rs8177451, rs8177452, rs8177453, rs8177454, rs3763010, rs8177455, rs8177456, rs736775, rs2277940, rs8177458, rs8177834, rs3924, rs2233312, rs2233311, rs2233310, rs2233309, rs4958875, rs2233308, rs2233307, rs2233306, rs2233305, rs2233304, rs2233303, rs2233302, rs2287719, rs2287720, rs7727034, rs7727250, rs7709800, rs3840312, rs2287721, rs6875293, rs3805434, rs2080982, rs2080983, rs2287722, rs2233301, rs2233300, rs4958876, rs2233299, rs2233298, rs2287723, rs2161359, rs7734456, rs4292439, rs4958878, rs6862024, rs3834819, rs2233297, rs2233296, rs2233295, rs2233294, rs7713028, rs7713223, rs7713567, rs888989, rs2233293, rs3749657, rs2233292, rs2112635, rs871269, rs3792794, rs6579837, rs3805433, rs5872186, rs2233291, rs2233290, rs2233289, rs4958435, rs4958880, rs1422673, rs2042234, rs3805432, rs3805431, rs2233288, rs2233287, rs3815720, rs3792792, rs3792791, rs2303018, rs3792790, rs4958436, rs2233286, rs2233285, rs7732451, rs2233284, rs1422674, rs3792789, rs4562032, rs6865077, rs1559126, rs3792788, rs1559127, rs3792786, rs6880110, rs6861227, rs3805430, rs1862364, rs4958881, rs3792785, rs6869605, rs6870205, rs4246047, rs4958882, rs3792784, rs3792783 and rs5872188 were tested for association with low BMD. Polymorphic variants at the following positions were associated with an increased risk of low BMD: rs1478398, rs1160114, rs1160113, rs1160112, rs4958858, rs4958431, rs6898463, rs4958859, rs4958860, rs4608909, rs707144, rs2042235, rs3763013, rs2042236, rs8177404, rs8177426, rs8177427, rs8177429, rs3792795, rs4958873, rs8177437, rs869975, rs8177447, rs11548, rs2277940, rs8177834, rs2233311, rs2233302, rs7727034, rs7727250, rs3805434, rs7734456, rs7713028, rs7713223, rs888989, rs3792794, rs4958880, rs1422673, rs3805432 and rs4958436. At these positions in SEQ ID NO:5, an adenine at position 231, a cytosine at position 582, a guanine at position 589, an adenine at position 1066, a thymine at position 5621, a guanine at position 5735, a cytosine at position 6658, a cytosine at position 7901, a thymine at position 15803, a cytosine at position 25599, a thymine at position 31203, a thymine at position 41624, a guanine at position 41671, an adenine at position 41825, a cytosine at position 43294, an adenine at position 46650, an adenine at position 46721, a guanine at position 46808, a guanine at position 47512, an adenine at position 47806, a guanine at position 49097, a guanine at position 50082, a thymine at position 51166, a cytosine at position 51493, a thymine at position 53187, an adenine at position 53699, a thymine at position 53929, a cytosine at position 58808, a cytosine at position 59187, a cytosine at position 59361, a cytosine at position 64049, a guanine at position 70882, an adenine at position 74131, a cytosine at position 74406, a cytosine at position 74740, a guanine at position 78432, a cytosine at position 82187, a

cytosine at position 82698, an adenine at position 83214 and a thymine at position 86539 were associated with risk of low BMD.

[0037] Based in part upon analyses summarized in Figures 1-5, regions with significant association have been identified in loci associated with low BMD. Any polymorphic variants associated with low BMD in a region of significant association can be utilized for embodiments described herein. The following table reports such regions, where “begin” and “end” designate the boundaries of the region according to chromosome positions within the genomic sequence provided in SEQ ID Nos:1-5. The locus, the chromosome on which the locus resides and an incident polymorphism in the locus also are noted.

TABLE 1: COMBINED ASSOCIATION RANGES

Incident SNP	Locus	Chromosome	Begin	End	Size
rs1801706	CETP	16q21	14328	68805	54477
rs1047699	PROL4	12p13	2424	93715	91291
rs1948017	GRID2	4q22	206	90969	90763
rs1498608	PDE4D	5q12	1599	82591	80992
rs869975	GPX3/TNIP1	5q23	231	86539	86308

Additional Polymorphic Variants Associated with Low BMD

[0038] Also provided is a method for identifying polymorphic variants proximal to an incident, founder polymorphic variant associated with low BMD. Thus, featured herein are methods for identifying a polymorphic variation associated with low BMD that is proximal to an incident polymorphic variation associated with low BMD, which comprises identifying a polymorphic variant proximal to the incident polymorphic variant associated with low BMD, where the incident polymorphic variant is in a *CETP*, *PROL4*, *GRID2*, *PDE4D* or *GPX3/TNIP1* nucleotide sequence. The nucleotide sequence often comprises a polynucleotide sequence selected from the group consisting of (a) a polynucleotide sequence of SEQ ID NO's:1-5; (b) a polynucleotide sequence that encodes a polypeptide having an amino acid sequence encoded by a polynucleotide sequence of SEQ ID NO's:1-5; and (c) a polynucleotide sequence that encodes a polypeptide having an amino acid sequence that is 90% or more identical to an amino acid sequence encoded by a nucleotide sequence of SEQ ID NO's:1-5 or a polynucleotide sequence 90% or more identical to the polynucleotide sequence of SEQ ID NO's:1-5. The presence or absence of an association of the proximal polymorphic variant with low BMD then is determined using a known association method, such as a method described in the Examples hereafter. In an embodiment, the incident polymorphic variant is a polymorphic variant associated with low BMD described herein. In

another embodiment, the proximal polymorphic variant identified sometimes is a publicly disclosed polymorphic variant, which for example, sometimes is published in a publicly available database. In other embodiments, the polymorphic variant identified is not publicly disclosed and is discovered using a known method, including, but not limited to, sequencing a region surrounding the incident polymorphic variant in a group of nucleic samples. Thus, multiple polymorphic variants proximal to an incident polymorphic variant are associated with low BMD using this method.

[0039] The proximal polymorphic variant often is identified in a region surrounding the incident polymorphic variant. In certain embodiments, this surrounding region is about 50 kb flanking the first polymorphic variant (*e.g.* about 50 kb 5' of the first polymorphic variant and about 50 kb 3' of the first polymorphic variant), and the region sometimes is composed of shorter flanking sequences, such as flanking sequences of about 40 kb, about 30 kb, about 25 kb, about 20 kb, about 15 kb, about 10 kb, about 7 kb, about 5 kb, or about 2 kb 5' and 3' of the incident polymorphic variant. In other embodiments, the region is composed of longer flanking sequences, such as flanking sequences of about 55 kb, about 60 kb, about 65 kb, about 70 kb, about 75 kb, about 80 kb, about 85 kb, about 90 kb, about 95 kb, or about 100 kb 5' and 3' of the incident polymorphic variant.

[0040] In certain embodiments, polymorphic variants associated with low BMD are identified iteratively. For example, a first proximal polymorphic variant is associated with low BMD using the methods described above and then another polymorphic variant proximal to the first proximal polymorphic variant is identified (*e.g.*, publicly disclosed or discovered) and the presence or absence of an association of one or more other polymorphic variants proximal to the first proximal polymorphic variant with low BMD is determined.

[0041] The methods described herein are useful for identifying or discovering additional polymorphic variants that may be used to further characterize a gene, region or loci associated with a condition, a disease (*e.g.*, osteoporosis), or a disorder. For example, allelotyping or genotyping data from the additional polymorphic variants may be used to identify a functional mutation or a region of linkage disequilibrium. In certain embodiments, polymorphic variants identified or discovered within a region comprising the first polymorphic variant associated with low BMD are genotyped using the genetic methods and sample selection techniques described herein, and it can be determined whether those polymorphic variants are in linkage disequilibrium with the first polymorphic variant. The size of the region in linkage disequilibrium with the first polymorphic variant also can be assessed using these genotyping methods. Thus, provided herein are methods for determining whether a polymorphic variant is in linkage disequilibrium with a first polymorphic variant associated with low BMD, and such information can be used in prognosis/diagnosis methods described herein.

Isolated Nucleic Acids

[0042] Featured herein are isolated *CETP*, *PROL4*, *GRID2*, *PDE4D* or *GPX3/TNIP1* nucleic acid variants depicted in SEQ ID NO's:1-10, and substantially identical nucleic acids thereof. A nucleic acid variant may be represented on one or both strands in a double-stranded nucleic acid or on one chromosomal complement (heterozygous) or both chromosomal complements (homozygous)).

[0043] As used herein, the term "nucleic acid" includes DNA molecules (*e.g.*, a complementary DNA (cDNA) and genomic DNA (gDNA)) and RNA molecules (*e.g.*, mRNA, rRNA, siRNA and tRNA) and analogs of DNA or RNA, for example, by use of nucleotide analogs. The nucleic acid molecule can be single-stranded and it is often double-stranded. The term "isolated or purified nucleic acid" refers to nucleic acids that are separated from other nucleic acids present in the natural source of the nucleic acid. For example, with regard to genomic DNA, the term "isolated" includes nucleic acids which are separated from the chromosome with which the genomic DNA is naturally associated. An "isolated" nucleic acid is often free of sequences which naturally flank the nucleic acid (*i.e.*, sequences located at the 5' and/or 3' ends of the nucleic acid) in the genomic DNA of the organism from which the nucleic acid is derived. For example, in various embodiments, the isolated nucleic acid molecule can contain less than about 5 kb, 4 kb, 3 kb, 2 kb, 1 kb, 0.5 kb or 0.1 kb of 5' and/or 3' nucleotide sequences which flank the nucleic acid molecule in genomic DNA of the cell from which the nucleic acid is derived. Moreover, an "isolated" nucleic acid molecule, such as a cDNA molecule, can be substantially free of other cellular material, or culture medium when produced by recombinant techniques, or substantially free of chemical precursors or other chemicals when chemically synthesized. As used herein, the term "gene" refers to a nucleotide sequence that encodes a polypeptide.

[0044] The nucleic acid often comprises a part of or all of a nucleotide sequence in SEQ ID NO's:1-5, or a substantially identical sequence thereof. Such a nucleotide sequence sometimes is a 5' and/or 3' sequence flanking a polymorphic variant described above that is 5-1000 nucleotides in length, or in some embodiments 5-500, 5-100, 5-75, 5-50, 5-45, 5-40, 5-35, 5-30, 5-25 or 5-20 nucleotides in length. Other embodiments are directed to methods of identifying a polymorphic variation at one or more positions in a nucleic acid (*e.g.*, genotyping at one or more positions in the nucleic acid), such as at a position corresponding to rs1801706 in the *CETP* gene, rs1047699 in the *PROL4* gene, rs1948017 in the *GRID2* gene, rs1498608 in the *PDE4D* gene, or rs869975 in the *GPX3* gene.

[0045] Also included herein are nucleic acid fragments. These fragments often are a nucleotide sequence identical to a nucleotide sequence of SEQ ID NO's:1-10, a nucleotide sequence substantially identical to a nucleotide sequence of SEQ ID NO's:1-10, or a nucleotide sequence that is complementary to the foregoing. The nucleic acid fragment may be identical, substantially identical or homologous to a

nucleotide sequence in an exon or an intron in a nucleotide sequence of SEQ ID NO's:1-5, and may encode a domain or part of a domain of a polypeptide. Sometimes, the fragment will comprises one or more of the polymorphic variations described herein as being associated with low BMD. The nucleic acid fragment is often 50, 100, or 200 or fewer base pairs in length, and is sometimes about 300, 400, 500, 600, 700, 800, 900, 1000, 1100, 1200, 1300, 1400, 1500, 2000, 3000, 4000, 5000, 10000, 15000, or 20000 base pairs in length. A nucleic acid fragment that is complementary to a nucleotide sequence identical or substantially identical to a nucleotide sequence in SEQ ID NO's:1-5 and hybridizes to such a nucleotide sequence under stringent conditions is often referred to as a "probe." Nucleic acid fragments often include one or more polymorphic sites, or sometimes have an end that is adjacent to a polymorphic site as described hereafter. *CETP* nucleic acid fragments sometimes encode the mature protein from positions 182 to 1609 of the mRNA sequence (SEQ ID NO: 6), for example.

[0046] An example of a nucleic acid fragment is an oligonucleotide. As used herein, the term "oligonucleotide" refers to a nucleic acid comprising about 8 to about 50 covalently linked nucleotides, often comprising from about 8 to about 35 nucleotides, and more often from about 10 to about 25 nucleotides. The backbone and nucleotides within an oligonucleotide may be the same as those of naturally occurring nucleic acids, or analogs or derivatives of naturally occurring nucleic acids, provided that oligonucleotides having such analogs or derivatives retain the ability to hybridize specifically to a nucleic acid comprising a targeted polymorphism. Oligonucleotides described herein may be used as hybridization probes or as components of prognostic or diagnostic assays, for example, as described herein.

[0047] Oligonucleotides are typically synthesized using standard methods and equipment, such as the ABI™3900 High Throughput DNA Synthesizer and the EXPEDITE™ 8909 Nucleic Acid Synthesizer, both of which are available from Applied Biosystems (Foster City, CA). Analogs and derivatives are exemplified in U.S. Pat. Nos. 4,469,863; 5,536,821; 5,541,306; 5,637,683; 5,637,684; 5,700,922; 5,717,083; 5,719,262; 5,739,308; 5,773,601; 5,886,165; 5,929,226; 5,977,296; 6,140,482; WO 00/56746; WO 01/14398, and related publications. Methods for synthesizing oligonucleotides comprising such analogs or derivatives are disclosed, for example, in the patent publications cited above and in U.S. Pat. Nos. 5,614,622; 5,739,314; 5,955,599; 5,962,674; 6,117,992; in WO 00/75372; and in related publications.

[0048] Oligonucleotides may also be linked to a second moiety. The second moiety may be an additional nucleotide sequence such as a tail sequence (e.g., a polyadenosine tail), an adapter sequence (e.g., phage M13 universal tail sequence), and others. Alternatively, the second moiety may be a non-nucleotide moiety such as a moiety which facilitates linkage to a solid support or a label to facilitate

detection of the oligonucleotide. Such labels include, without limitation, a radioactive label, a fluorescent label, a chemiluminescent label, a paramagnetic label, and the like. The second moiety may be attached to any position of the oligonucleotide, provided the oligonucleotide can hybridize to the nucleic acid comprising the polymorphism.

Uses of Nucleic Acid Sequence

[0049] Nucleic acid coding sequences (*e.g.*, SEQ ID NO: 7-12) may be used for diagnostic purposes for detection and control of polypeptide expression. Also, included herein are oligonucleotide sequences such as antisense RNA, small-interfering RNA (siRNA) and DNA molecules and ribozymes that function to inhibit translation of a polypeptide. Antisense techniques and RNA interference techniques are known in the art and are described herein.

[0050] Ribozymes are enzymatic RNA molecules capable of catalyzing the specific cleavage of RNA. The mechanism of ribozyme action involves sequence specific hybridization of the ribozyme molecule to complementary target RNA, followed by endonucleolytic cleavage. For example, hammerhead motif ribozyme molecules may be engineered that specifically and efficiently catalyze endonucleolytic cleavage of RNA sequences corresponding to or complementary to *CETP*, *PROL4*, *GRID2*, *PDE4D* or *GPX3/TNIP1* nucleotide sequences. Specific ribozyme cleavage sites within any potential RNA target are initially identified by scanning the target molecule for ribozyme cleavage sites which include the following sequences, GUA, GUU and GUC. Once identified, short RNA sequences of between fifteen (15) and twenty (20) ribonucleotides corresponding to the region of the target gene containing the cleavage site may be evaluated for predicted structural features such as secondary structure that may render the oligonucleotide sequence unsuitable. The suitability of candidate targets may also be evaluated by testing their accessibility to hybridization with complementary oligonucleotides, using ribonuclease protection assays.

[0051] Antisense RNA and DNA molecules, siRNA and ribozymes may be prepared by any method known in the art for the synthesis of RNA molecules. These include techniques for chemically synthesizing oligodeoxyribonucleotides well known in the art such as solid phase phosphoramidite chemical synthesis. Alternatively, RNA molecules may be generated by *in vitro* and *in vivo* transcription of DNA sequences encoding the antisense RNA molecule. Such DNA sequences may be incorporated into a wide variety of vectors which incorporate suitable RNA polymerase promoters such as the T7 or SP6 polymerase promoters. Alternatively, antisense cDNA constructs that synthesize antisense RNA constitutively or inducibly, depending on the promoter used, can be introduced stably into cell lines.

[0052] DNA encoding a polypeptide also may have a number of uses for the diagnosis of diseases, including low BMD, resulting from aberrant expression of a target gene described herein. For example, the nucleic acid sequence may be used in hybridization assays of biopsies or autopsies to diagnose abnormalities of expression or function (*e.g.*, Southern or Northern blot analysis, *in situ* hybridization assays).

[0053] In addition, the expression of a polypeptide during embryonic development may also be determined using nucleic acid encoding the polypeptide. As addressed, *infra*, production of functionally impaired polypeptide is the cause of various disease states, such as osteoporosis. *In situ* hybridizations using polypeptide as a probe may be employed to predict problems related to low BMD. Further, as indicated, *infra*, administration of human active polypeptide, recombinantly produced as described herein, may be used to treat disease states related to functionally impaired polypeptide. Alternatively, gene therapy approaches may be employed to remedy deficiencies of functional polypeptide or to replace or compete with dysfunctional polypeptide.

Expression Vectors, Host Cells, and Genetically Engineered Cells

[0054] Provided herein are nucleic acid vectors, often expression vectors, which contain a *CETP*, *PROL4*, *GRID2*, *PDE4D* or *GPX3/TNIP1* nucleotide sequence or a substantially identical sequence thereof. As used herein, the term “vector” refers to a nucleic acid molecule capable of transporting another nucleic acid to which it has been linked and can include a plasmid, cosmid, or viral vector. The vector can be capable of autonomous replication or it can integrate into a host DNA. Viral vectors may include replication defective retroviruses, adenoviruses and adeno-associated viruses for example.

[0055] A vector can include a *CETP*, *PROL4*, *GRID2*, *PDE4D* or *GPX3/TNIP1* nucleotide sequence in a form suitable for expression of an encoded target polypeptide or target nucleic acid in a host cell. A “target polypeptide” is a polypeptide encoded by a *CETP*, *PROL4*, *GRID2*, *PDE4D* or *GPX3/TNIP1* nucleotide sequence or a substantially identical nucleotide sequence thereof. The recombinant expression vector typically includes one or more regulatory sequences operatively linked to the nucleic acid sequence to be expressed. The term “regulatory sequence” includes promoters, enhancers and other expression control elements (*e.g.*, polyadenylation signals). Regulatory sequences include those that direct constitutive expression of a nucleotide sequence, as well as tissue-specific regulatory and/or inducible sequences. The design of the expression vector can depend on such factors as the choice of the host cell to be transformed, the level of expression of polypeptide desired, and the like. Expression vectors can be introduced into host cells to produce target polypeptides, including fusion polypeptides.

[0056] Recombinant expression vectors can be designed for expression of target polypeptides in prokaryotic or eukaryotic cells. For example, target polypeptides can be expressed in *E. coli*, insect cells (e.g., using baculovirus expression vectors), yeast cells, or mammalian cells. Suitable host cells are discussed further in Goeddel, *Gene Expression Technology: Methods in Enzymology 185*, Academic Press, San Diego, CA (1990). Alternatively, the recombinant expression vector can be transcribed and translated *in vitro*, for example using T7 promoter regulatory sequences and T7 polymerase.

[0057] Expression of polypeptides in prokaryotes is most often carried out in *E. coli* with vectors containing constitutive or inducible promoters directing the expression of either fusion or non-fusion polypeptides. Fusion vectors add a number of amino acids to a polypeptide encoded therein, usually to the amino terminus of the recombinant polypeptide. Such fusion vectors typically serve three purposes: 1) to increase expression of recombinant polypeptide; 2) to increase the solubility of the recombinant polypeptide; and 3) to aid in the purification of the recombinant polypeptide by acting as a ligand in affinity purification. Often, a proteolytic cleavage site is introduced at the junction of the fusion moiety and the recombinant polypeptide to enable separation of the recombinant polypeptide from the fusion moiety subsequent to purification of the fusion polypeptide. Such enzymes, and their cognate recognition sequences, include Factor Xa, thrombin and enterokinase. Typical fusion expression vectors include pGEX (Pharmacia Biotech Inc; Smith & Johnson, *Gene 67*: 31-40 (1988)), pMAL (New England Biolabs, Beverly, MA) and pRIT5 (Pharmacia, Piscataway, NJ) which fuse glutathione S-transferase (GST), maltose E binding polypeptide, or polypeptide A, respectively, to the target recombinant polypeptide.

[0058] Purified fusion polypeptides can be used in screening assays and to generate antibodies specific for target polypeptides. In a therapeutic embodiment, fusion polypeptide expressed in a retroviral expression vector is used to infect bone marrow cells that are subsequently transplanted into irradiated recipients. The pathology of the subject recipient is then examined after sufficient time has passed (e.g., six (6) weeks).

[0059] Expressing the polypeptide in host bacteria with an impaired capacity to proteolytically cleave the recombinant polypeptide is often used to maximize recombinant polypeptide expression (Gottesman, S., *Gene Expression Technology: Methods in Enzymology*, Academic Press, San Diego, California 185: 119-128 (1990)). Another strategy is to alter the nucleotide sequence of the nucleic acid to be inserted into an expression vector so that the individual codons for each amino acid are those preferentially utilized in *E. coli* (Wada *et al.*, *Nucleic Acids Res.* 20: 2111-2118 (1992)). Such alteration of nucleotide sequences can be carried out by standard DNA synthesis techniques.

[0060] When used in mammalian cells, the expression vector's control functions are often provided by viral regulatory elements. For example, commonly used promoters are derived from polyoma, Adenovirus 2, cytomegalovirus and Simian Virus 40. Recombinant mammalian expression vectors are often capable of directing expression of the nucleic acid in a particular cell type (e.g., tissue-specific regulatory elements are used to express the nucleic acid). Non-limiting examples of suitable tissue-specific promoters include an albumin promoter (liver-specific; Pinkert *et al.*, *Genes Dev.* 1: 268-277 (1987)), lymphoid-specific promoters (Calame & Eaton, *Adv. Immunol.* 43: 235-275 (1988)), promoters of T cell receptors (Winoto & Baltimore, *EMBO J.* 8: 729-733 (1989)) promoters of immunoglobulins (Banerji *et al.*, *Cell* 33: 729-740 (1983); Queen & Baltimore, *Cell* 33: 741-948 (1983)), neuron-specific promoters (e.g., the neurofilament promoter; Byrne & Ruddle, *Proc. Natl. Acad. Sci. USA* 86: 5473-5477 (1989)), pancreas-specific promoters (Edlund *et al.*, *Science* 230: 912-916 (1985)), and mammary gland-specific promoters (e.g., milk whey promoter; U.S. Patent No. 4,873,316 and European Application Publication No. 264,166). Developmentally-regulated promoters are sometimes utilized, for example, the murine hox promoters (Kessel & Gruss, *Science* 249: 374-379 (1990)) and the α -fetopolyptide promoter (Campes & Tilghman, *Genes Dev.* 3: 537-546 (1989)).

[0061] A *CETP*, *PROL4*, *GRID2*, *PDE4D* or *GPX3/TNIP1* nucleic acid may also be cloned into an expression vector in an antisense orientation. Regulatory sequences (e.g., viral promoters and/or enhancers) operatively linked to a *CETP*, *PROL4*, *GRID2*, *PDE4D* or *GPX3/TNIP1* nucleic acid cloned in the antisense orientation can be chosen for directing constitutive, tissue specific or cell type specific expression of antisense RNA in a variety of cell types. Antisense expression vectors can be in the form of a recombinant plasmid, phagemid or attenuated virus. For a discussion of the regulation of gene expression using antisense genes see, e.g., Weintraub *et al.*, Antisense RNA as a molecular tool for genetic analysis, *Reviews - Trends in Genetics*, Vol. 1(1) (1986).

[0062] Also provided herein are host cells that include a *CETP*, *PROL4*, *GRID2*, *PDE4D* or *GPX3/TNIP1* nucleotide sequence within a recombinant expression vector or a fragment of such a nucleotide sequence which facilitate homologous recombination into a specific site of the host cell genome. The terms "host cell" and "recombinant host cell" are used interchangeably herein. Such terms refer not only to the particular subject cell but rather also to the progeny or potential progeny of such a cell. Because certain modifications may occur in succeeding generations due to either mutation or environmental influences, such progeny may not, in fact, be identical to the parent cell, but are still included within the scope of the term as used herein. A host cell can be any prokaryotic or eukaryotic cell. For example, a target polypeptide can be expressed in bacterial cells such as *E. coli*, insect cells,

yeast or mammalian cells (such as Chinese hamster ovary cells (CHO) or COS cells). Other suitable host cells are known to those skilled in the art.

[0063] Vectors can be introduced into host cells via conventional transformation or transfection techniques. As used herein, the terms “transformation” and “transfection” are intended to refer to a variety of art-recognized techniques for introducing foreign nucleic acid (*e.g.*, DNA) into a host cell, including calcium phosphate or calcium chloride co-precipitation, transduction/infection, DEAE-dextran-mediated transfection, lipofection, or electroporation.

[0064] A host cell provided herein can be used to produce (*i.e.*, express) a target polypeptide or a substantially identical polypeptide thereof. Accordingly, further provided are methods for producing a target polypeptide using host cells described herein. In one embodiment, the method includes culturing host cells into which a recombinant expression vector encoding a target polypeptide has been introduced in a suitable medium such that a target polypeptide is produced. In another embodiment, the method further includes isolating a target polypeptide from the medium or the host cell.

[0065] Also provided are cells or purified preparations of cells which include a *CETP*, *PROL4*, *GRID2*, *PDE4D* or *GPX3/TNIP1* transgene, or which otherwise misexpress target polypeptide. Cell preparations can consist of human or non-human cells, *e.g.*, rodent cells, *e.g.*, mouse or rat cells, rabbit cells, or pig cells. In preferred embodiments, the cell or cells include a *CETP*, *PROL4*, *GRID2*, *PDE4D* or *GPX3/TNIP1* transgene (*e.g.*, a heterologous form of a *CETP*, *PROL4*, *GRID2*, *PDE4D* or *GPX3/TNIP1* gene, such as a human gene expressed in non-human cells). The transgene can be misexpressed, *e.g.*, overexpressed or underexpressed. In other preferred embodiments, the cell or cells include a gene which misexpress an endogenous target polypeptide (*e.g.*, expression of a gene is disrupted, also known as a knockout). Such cells can serve as a model for studying disorders which are related to mutated or mis-expressed alleles or for use in drug screening. Also provided are human cells (*e.g.*, a hematopoietic stem cells) transformed with a *CETP*, *PROL4*, *GRID2*, *PDE4D* or *GPX3/TNIP1* nucleic acid.

[0066] Also provided are cells or a purified preparation thereof (*e.g.*, human cells) in which an endogenous *CETP*, *PROL4*, *GRID2*, *PDE4D* or *GPX3/TNIP1* nucleic acid is under the control of a regulatory sequence that does not normally control the expression of the endogenous gene corresponding to a *CETP*, *PROL4*, *GRID2*, *PDE4D* or *GPX3/TNIP1* nucleotide sequence. The expression characteristics of an endogenous gene within a cell (*e.g.*, a cell line or microorganism) can be modified by inserting a heterologous DNA regulatory element into the genome of the cell such that the inserted regulatory element is operably linked to the corresponding endogenous gene. For example, an endogenous corresponding gene (*e.g.*, a gene which is “transcriptionally silent,” not normally expressed,

or expressed only at very low levels) may be activated by inserting a regulatory element which is capable of promoting the expression of a normally expressed gene product in that cell. Techniques such as targeted homologous recombinations, can be used to insert the heterologous DNA as described in, *e.g.*, Chappel, US 5,272,071; WO 91/06667, published on May 16, 1991.

Transgenic Animals

[0067] Non-human transgenic animals that express a heterologous target polypeptide (*e.g.*, expressed from a *CETP*, *PROL4*, *GRID2*, *PDE4D* or *GPX3/TNIP1* nucleic acid or substantially identical sequence thereof) can be generated. Such animals are useful for studying the function and/or activity of a target polypeptide and for identifying and/or evaluating modulators of the activity of *CETP*, *PROL4*, *GRID2*, *PDE4D* or *GPX3/TNIP1* nucleic acids and encoded polypeptides. As used herein, a “transgenic animal” is a non-human animal such as a mammal (*e.g.*, a non-human primate such as chimpanzee, baboon, or macaque; an ungulate such as an equine, bovine, or caprine; or a rodent such as a rat, a mouse, or an Israeli sand rat), a bird (*e.g.*, a chicken or a turkey), an amphibian (*e.g.*, a frog, salamander, or newt), or an insect (*e.g.*, *Drosophila melanogaster*), in which one or more of the cells of the animal includes a transgene. A transgene is exogenous DNA or a rearrangement (*e.g.*, a deletion of endogenous chromosomal DNA) that is often integrated into or occurs in the genome of cells in a transgenic animal. A transgene can direct expression of an encoded gene product in one or more cell types or tissues of the transgenic animal, and other transgenes can reduce expression (*e.g.*, a knockout). Thus, a transgenic animal can be one in which an endogenous nucleic acid homologous to a *CETP*, *PROL4*, *GRID2*, *PDE4D* or *GPX3/TNIP1* nucleic acid has been altered by homologous recombination between the endogenous gene and an exogenous DNA molecule introduced into a cell of the animal (*e.g.*, an embryonic cell of the animal) prior to development of the animal.

[0068] Intronic sequences and polyadenylation signals can also be included in the transgene to increase expression efficiency of the transgene. One or more tissue-specific regulatory sequences can be operably linked to a *CETP*, *PROL4*, *GRID2*, *PDE4D* or *GPX3/TNIP1* nucleotide sequence to direct expression of an encoded polypeptide to particular cells. A transgenic founder animal can be identified based upon the presence of a *CETP*, *PROL4*, *GRID2*, *PDE4D* or *GPX3/TNIP1* nucleotide sequence in its genome and/or expression of encoded mRNA in tissues or cells of the animals. A transgenic founder animal can then be used to breed additional animals carrying the transgene. Moreover, transgenic animals carrying a *CETP*, *PROL4*, *GRID2*, *PDE4D* or *GPX3/TNIP1* nucleotide sequence can further be bred to other transgenic animals carrying other transgenes.

[0069] Target polypeptides can be expressed in transgenic animals or plants by introducing, for example, a *CETP*, *PROL4*, *GRID2*, *PDE4D* or *GPX3/TNIP1* nucleic acid into the genome of an animal that encodes the target polypeptide. In preferred embodiments the nucleic acid is placed under the control of a tissue specific promoter, *e.g.*, a milk or egg specific promoter, and recovered from the milk or eggs produced by the animal. Also included is a population of cells from a transgenic animal.

Target Polypeptides

[0070] Also featured herein are isolated target polypeptides, which are encoded by a *CETP*, *PROL4*, *GRID2*, *PDE4D* or *GPX3/TNIP1* nucleotide sequence (*e.g.*, SEQ ID NO's:1-10) or a substantially identical nucleotide sequence thereof, such as the polypeptides having amino acid sequences in SEQ ID NO's:11-15. The term "polypeptide" as used herein includes proteins and peptides. An "isolated" or "purified" polypeptide or protein is substantially free of cellular material or other contaminating proteins from the cell or tissue source from which the protein is derived, or substantially free from chemical precursors or other chemicals when chemically synthesized. In one embodiment, the language "substantially free" means preparation of a target polypeptide having less than about 30%, 20%, 10% and more preferably 5% (by dry weight), of non-target polypeptide (also referred to herein as a "contaminating protein"), or of chemical precursors or non-target chemicals. When the target polypeptide or a biologically active portion thereof is recombinantly produced, it is also preferably substantially free of culture medium, specifically, where culture medium represents less than about 20%, sometimes less than about 10%, and often less than about 5% of the volume of the polypeptide preparation. Isolated or purified target polypeptide preparations are sometimes 0.01 milligrams or more or 0.1 milligrams or more, and often 1.0 milligrams or more and 10 milligrams or more in dry weight.

[0071] Further included herein are target polypeptide fragments. The polypeptide fragment may be a domain or part of a domain of a target polypeptide. In addition, the polypeptide fragment may be a full-length polypeptide or a mature polypeptide (*i.e.*, the polypeptide minus the signal peptide). For example, a fragment sometimes is a *CTEP* mature protein that corresponds to amino acid positions 18-493 of SEQ ID NO:11. The polypeptide fragment may have increased, decreased or unexpected biological activity. The polypeptide fragment is often 50 or fewer, 100 or fewer, or 200 or fewer amino acids in length, and is sometimes 300, 400, 500, 600, 700, or 900 or fewer amino acids in length.

[0072] Substantially identical target polypeptides may depart from the amino acid sequences of target polypeptides in different manners. For example, conservative amino acid modifications may be introduced at one or more positions in the amino acid sequences of target polypeptides. A "conservative amino acid substitution" is one in which the amino acid is replaced by another amino acid having a

similar structure and/or chemical function. Families of amino acid residues having similar structures and functions are well known. These families include amino acids with basic side chains (*e.g.*, lysine, arginine, histidine), acidic side chains (*e.g.*, aspartic acid, glutamic acid), uncharged polar side chains (*e.g.*, glycine, asparagine, glutamine, serine, threonine, tyrosine, cysteine), nonpolar side chains (*e.g.*, alanine, valine, leucine, isoleucine, proline, phenylalanine, methionine, tryptophan), beta-branched side chains (*e.g.*, threonine, valine, isoleucine) and aromatic side chains (*e.g.*, tyrosine, phenylalanine, tryptophan, histidine). Also, essential and non-essential amino acids may be replaced. A “non-essential” amino acid is one that can be altered without abolishing or substantially altering the biological function of a target polypeptide, whereas altering an “essential” amino acid abolishes or substantially alters the biological function of a target polypeptide. Amino acids that are conserved among target polypeptides are typically essential amino acids.

[0073] Also, target polypeptides may exist as chimeric or fusion polypeptides. As used herein, a target “chimeric polypeptide” or target “fusion polypeptide” includes a target polypeptide linked to a non-target polypeptide. A “non-target polypeptide” refers to a polypeptide having an amino acid sequence corresponding to a polypeptide which is not substantially identical to the target polypeptide, which includes, for example, a polypeptide that is different from the target polypeptide and derived from the same or a different organism. The target polypeptide in the fusion polypeptide can correspond to an entire or nearly entire target polypeptide or a fragment thereof. The non-target polypeptide can be fused to the N-terminus or C-terminus of the target polypeptide.

[0074] Fusion polypeptides can include a moiety having high affinity for a ligand. For example, the fusion polypeptide can be a GST-target fusion polypeptide in which the target sequences are fused to the C-terminus of the GST sequences, or a polyhistidine-target fusion polypeptide in which the target polypeptide is fused at the N- or C-terminus to a string of histidine residues. Such fusion polypeptides can facilitate purification of recombinant target polypeptide. Expression vectors are commercially available that already encode a fusion moiety (*e.g.*, a GST polypeptide), and a nucleotide sequence in SEQ ID NO's:1-10, or a substantially identical nucleotide sequence thereof, can be cloned into an expression vector such that the fusion moiety is linked in-frame to the target polypeptide. Further, the fusion polypeptide can be a target polypeptide containing a heterologous signal sequence at its N-terminus. In certain host cells (*e.g.*, mammalian host cells), expression, secretion, cellular internalization, and cellular localization of a target polypeptide can be increased through use of a heterologous signal sequence. Fusion polypeptides can also include all or a part of a serum polypeptide (*e.g.*, an IgG constant region or human serum albumin).

[0075] Target polypeptides can be incorporated into pharmaceutical compositions and administered to a subject *in vivo*. Administration of these target polypeptides can be used to affect the bioavailability of a substrate of the target polypeptide and may effectively increase target polypeptide biological activity in a cell. Target fusion polypeptides may be useful therapeutically for the treatment of disorders caused by, for example, (i) aberrant modification or mutation of a gene encoding a target polypeptide; (ii) mis-regulation of the gene encoding the target polypeptide; and (iii) aberrant post-translational modification of a target polypeptide. Also, target polypeptides can be used as immunogens to produce anti-target antibodies in a subject, to purify target polypeptide ligands or binding partners, and in screening assays to identify molecules which inhibit or enhance the interaction of a target polypeptide with a substrate.

[0076] In addition, polypeptides can be chemically synthesized using techniques known in the art (See, *e.g.*, Creighton, 1983 Proteins. New York, N.Y.: W. H. Freeman and Company; and Hunkapiller *et al.*, (1984) Nature July 12 -18;310(5973):105-11). For example, a relative short fragment can be synthesized by use of a peptide synthesizer. Furthermore, if desired, non-classical amino acids or chemical amino acid analogs can be introduced as a substitution or addition into the fragment sequence. Non-classical amino acids include, but are not limited to, to the D-isomers of the common amino acids, 2,4-diaminobutyric acid, α -amino isobutyric acid, 4-aminobutyric acid, Abu, 2-amino butyric acid, g-Abu, e-Ahx, 6-amino hexanoic acid, Aib, 2-amino isobutyric acid, 3-amino propionic acid, ornithine, norleucine, norvaline, hydroxyproline, sarcosine, citrulline, homocitrulline, cysteic acid, t-butylglycine, t-butylalanine, phenylglycine, cyclohexylalanine, b-alanine, fluoroamino acids, designer amino acids such as b-methyl amino acids, Ca-methyl amino acids, Na-methyl amino acids, and amino acid analogs in general. Furthermore, the amino acid can be D (dextrorotary) or L (levorotary).

[0077] Polypeptides and polypeptide fragments sometimes are differentially modified during or after translation, *e.g.*, by glycosylation, acetylation, phosphorylation, amidation, derivatization by known protecting/blocking groups, proteolytic cleavage, linkage to an antibody molecule or other cellular ligand, etc. Any of numerous chemical modifications may be carried out by known techniques, including but not limited, to specific chemical cleavage by cyanogen bromide, trypsin, chymotrypsin, papain, V8 protease, NaBH₄; acetylation, formylation, oxidation, reduction; metabolic synthesis in the presence of tunicamycin; and the like. Additional post-translational modifications include, for example, N-linked or O-linked carbohydrate chains, processing of N-terminal or C-terminal ends), attachment of chemical moieties to the amino acid backbone, chemical modifications of N-linked or O-linked carbohydrate chains, and addition or deletion of an N-terminal methionine residue as a result of prokaryotic host cell expression. The polypeptide fragments may also be modified with a detectable label, such as an enzymatic, fluorescent, isotopic or affinity label to allow for detection and isolation of the polypeptide.

[0078] Also provided are chemically modified derivatives of polypeptides that can provide additional advantages such as increased solubility, stability and circulating time of the polypeptide, or decreased immunogenicity (*see e.g.*, U.S. Pat. No: 4,179,337. The chemical moieties for derivitization may be selected from water soluble polymers such as polyethylene glycol, ethylene glycol/propylene glycol copolymers, carboxymethylcellulose, dextran, polyvinyl alcohol and the like. The polypeptides may be modified at random positions within the molecule, or at predetermined positions within the molecule and may include one, two, three or more attached chemical moieties.

[0079] The polymer may be of any molecular weight, and may be branched or unbranched. For polyethylene glycol, the preferred molecular weight is between about 1 kDa and about 100 kDa (the term "about" indicating that in preparations of polyethylene glycol, some molecules will weigh more, some less, than the stated molecular weight) for ease in handling and manufacturing. Other sizes may be used, depending on the desired therapeutic profile (*e.g.*, the duration of sustained release desired, the effects, if any on biological activity, the ease in handling, the degree or lack of antigenicity and other known effects of the polyethylene glycol to a therapeutic protein or analog).

[0080] The polymers should be attached to the polypeptide with consideration of effects on functional or antigenic domains of the polypeptide. There are a number of attachment methods available to those skilled in the art (*e.g.*, EP 0 401 384 (coupling PEG to G-CSF) and Malik *et al.* (1992) Exp Hematol. September;20(8):1028-35 (pegylation of GM-CSF using tresyl chloride)). For example, polyethylene glycol may be covalently bound through amino acid residues via a reactive group, such as a free amino or carboxyl group. Reactive groups are those to which an activated polyethylene glycol molecule may be bound. The amino acid residues having a free amino group may include lysine residues and the N-terminal amino acid residues; those having a free carboxyl group may include aspartic acid residues, glutamic acid residues and the C-terminal amino acid residue. Sulfhydryl groups may also be used as a reactive group for attaching the polyethylene glycol molecules. For therapeutic purposes, the attachment sometimes is at an amino group, such as attachment at the N-terminus or lysine group.

[0081] Proteins can be chemically modified at the N-terminus. Using polyethylene glycol as an illustration of such a composition, one may select from a variety of polyethylene glycol molecules (by molecular weight, branching, and the like), the proportion of polyethylene glycol molecules to protein (polypeptide) molecules in the reaction mix, the type of pegylation reaction to be performed, and the method of obtaining the selected N-terminally pegylated protein. The method of obtaining the N-terminally pegylated preparation (*i.e.*, separating this moiety from other monopegylated moieties if necessary) may be by purification of the N-terminally pegylated material from a population of pegylated protein molecules. Selective proteins chemically modified at the N-terminus may be accomplished by

reductive alkylation, which exploits differential reactivity of different types of primary amino groups (lysine versus the N-terminal) available for derivatization in a particular protein. Under the appropriate reaction conditions, substantially selective derivatization of the protein at the N-terminus with a carbonyl group containing polymer is achieved.

Substantially Identical Nucleic Acids and Polypeptides

[0082] Nucleotide sequences and polypeptide sequences that are substantially identical to a *CETP*, *PROL4*, *GRID2*, *PDE4D* or *GPX3/TNIP1* nucleotide sequence and the target polypeptide sequences encoded by those nucleotide sequences, respectively, are included herein. The term “substantially identical” as used herein refers to two or more nucleic acids or polypeptides sharing one or more identical nucleotide sequences or polypeptide sequences, respectively. Included are nucleotide sequences or polypeptide sequences that are 55% or more, 60% or more, 65% or more, 70% or more, 75% or more, 80% or more, 85% or more, 90% or more, 95% or more (each often within a 1%, 2%, 3% or 4% variability) identical to a *CETP*, *PROL4*, *GRID2*, *PDE4D* or *GPX3/TNIP1* nucleotide sequence or the encoded target polypeptide amino acid sequences. One test for determining whether two nucleic acids are substantially identical is to determine the percent of identical nucleotide sequences or polypeptide sequences shared between the nucleic acids or polypeptides.

[0083] Calculations of sequence identity are often performed as follows. Sequences are aligned for optimal comparison purposes (*e.g.*, gaps can be introduced in one or both of a first and a second amino acid or nucleic acid sequence for optimal alignment and non-homologous sequences can be disregarded for comparison purposes). The length of a reference sequence aligned for comparison purposes is sometimes 30% or more, 40% or more, 50% or more, often 60% or more, and more often 70% or more, 80% or more, 90% or more, or 100% of the length of the reference sequence. The nucleotides or amino acids at corresponding nucleotide or polypeptide positions, respectively, are then compared among the two sequences. When a position in the first sequence is occupied by the same nucleotide or amino acid as the corresponding position in the second sequence, the nucleotides or amino acids are deemed to be identical at that position. The percent identity between the two sequences is a function of the number of identical positions shared by the sequences, taking into account the number of gaps, and the length of each gap, introduced for optimal alignment of the two sequences.

[0084] Comparison of sequences and determination of percent identity between two sequences can be accomplished using a mathematical algorithm. Percent identity between two amino acid or nucleotide sequences can be determined using the algorithm of Meyers & Miller, *CABIOS* 4: 11-17 (1989), which has been incorporated into the ALIGN program (version 2.0), using a PAM120 weight residue table, a

gap length penalty of 12 and a gap penalty of 4. Also, percent identity between two amino acid sequences can be determined using the Needleman & Wunsch, *J. Mol. Biol.* 48: 444-453 (1970) algorithm which has been incorporated into the GAP program in the GCG software package (available at the http address www.gcg.com), using either a Blossum 62 matrix or a PAM250 matrix, and a gap weight of 16, 14, 12, 10, 8, 6, or 4 and a length weight of 1, 2, 3, 4, 5, or 6. Percent identity between two nucleotide sequences can be determined using the GAP program in the GCG software package (available at http address www.gcg.com), using a NWSgapdna.CMP matrix and a gap weight of 40, 50, 60, 70, or 80 and a length weight of 1, 2, 3, 4, 5, or 6. A set of parameters often used is a Blossum 62 scoring matrix with a gap open penalty of 12, a gap extend penalty of 4, and a frameshift gap penalty of 5.

[0085] Another manner for determining if two nucleic acids are substantially identical is to assess whether a polynucleotide homologous to one nucleic acid will hybridize to the other nucleic acid under stringent conditions. As use herein, the term "stringent conditions" refers to conditions for hybridization and washing. Stringent conditions are known to those skilled in the art and can be found in *Current Protocols in Molecular Biology*, John Wiley & Sons, N.Y., 6.3.1-6.3.6 (1989). Aqueous and non-aqueous methods are described in that reference and either can be used. An example of stringent hybridization conditions is hybridization in 6X sodium chloride/sodium citrate (SSC) at about 45°C, followed by one or more washes in 0.2X SSC, 0.1% SDS at 50°C. Another example of stringent hybridization conditions are hybridization in 6X sodium chloride/sodium citrate (SSC) at about 45°C, followed by one or more washes in 0.2X SSC, 0.1% SDS at 55°C. A further example of stringent hybridization conditions is hybridization in 6X sodium chloride/sodium citrate (SSC) at about 45°C, followed by one or more washes in 0.2X SSC, 0.1% SDS at 60°C. Often, stringent hybridization conditions are hybridization in 6X sodium chloride/sodium citrate (SSC) at about 45°C, followed by one or more washes in 0.2X SSC, 0.1% SDS at 65°C. More often, stringency conditions are 0.5M sodium phosphate, 7% SDS at 65°C, followed by one or more washes at 0.2X SSC, 1% SDS at 65°C.

[0086] An example of a substantially identical nucleotide sequence to a nucleotide sequence in SEQ ID NO's:1-10 is one that has a different nucleotide sequence but still encodes the same polypeptide sequence encoded by the nucleotide sequence in SEQ ID NO's:1-10. Another example is a nucleotide sequence that encodes a polypeptide having a polypeptide sequence that is more than 70% or more identical to, sometimes more than 75% or more, 80% or more, or 85% or more identical to, and often more than 90% or more and 95% or more identical to a polypeptide sequence encoded by a nucleotide sequence in SEQ ID NO's:1-10. As used herein, "SEQ ID NO's:1-10" typically refers to one or more sequences in SEQ ID NO: 1, 2, 3, 4, 5, 6, 7, 8, 9, and/or 10. Many of the embodiments described herein are applicable to (a) a nucleotide sequence of SEQ ID NO's:1-10; (b) a nucleotide sequence which

encodes a polypeptide consisting of an amino acid sequence encoded by a nucleotide sequence of SEQ ID NO's:1-10; (c) a nucleotide sequence which encodes a polypeptide that is 90% or more identical to an amino acid sequence encoded by a nucleotide sequence of SEQ ID NO's:1-10, or a nucleotide sequence about 90% or more identical to a nucleotide sequence of SEQ ID NO's:1-10; (d) a fragment of a nucleotide sequence of (a), (b), or (c); and/or a nucleotide sequence complementary to the nucleotide sequences of (a), (b), (c) and/or (d), where nucleotide sequences of (b) and (c), fragments of (b) and (c) and nucleotide sequences complementary to (b) and (c) are examples of substantially identical nucleotide sequences. Examples of substantially identical nucleotide sequences include nucleotide sequences from subjects that differ by naturally occurring genetic variance, which sometimes is referred to as background genetic variance (*e.g.*, nucleotide sequences differing by natural genetic variance sometimes are 90%, 91%, 92%, 93%, 94%, 95%, 96%, 97%, 98%, or 99% identical to one another).

[0087] Nucleotide sequences in SEQ ID NO's:1-10 and amino acid sequences of encoded polypeptides can be used as "query sequences" to perform a search against public databases to identify other family members or related sequences, for example. Such searches can be performed using the NBLAST and XBLAST programs (version 2.0) of Altschul *et al.*, *J. Mol. Biol.* 215: 403-10 (1990). BLAST nucleotide searches can be performed with the NBLAST program, score = 100, wordlength = 12 to obtain nucleotide sequences homologous to nucleotide sequences in SEQ ID NO's:1-10. BLAST polypeptide searches can be performed with the XBLAST program, score = 50, wordlength = 3 to obtain amino acid sequences homologous to polypeptides encoded by the nucleotide sequences of SEQ ID NO's:1-10. To obtain gapped alignments for comparison purposes, Gapped BLAST can be utilized as described in Altschul *et al.*, *Nucleic Acids Res.* 25(17): 3389-3402 (1997). When utilizing BLAST and Gapped BLAST programs, default parameters of the respective programs (*e.g.*, XBLAST and NBLAST) can be used (*see* the http address www.ncbi.nlm.nih.gov).

[0088] A nucleic acid that is substantially identical to a nucleotide sequence in SEQ ID NO's:1-10 may include polymorphic sites at positions equivalent to those described herein when the sequences are aligned. For example, using the alignment procedures described herein, SNPs in a sequence substantially identical to a sequence in SEQ ID NO's:1-10 can be identified at nucleotide positions that match with or correspond to (*i.e.*, align) nucleotides at SNP positions in each nucleotide sequence in SEQ ID NO's:1-10. Also, where a polymorphic variation results in an insertion or deletion, insertion or deletion of a nucleotide sequence from a reference sequence can change the relative positions of other polymorphic sites in the nucleotide sequence.

[0089] Substantially identical nucleotide and polypeptide sequences include those that are naturally occurring, such as allelic variants (same locus), splice variants, homologs (different locus), and orthologs

(different organism) or can be non-naturally occurring. Non-naturally occurring variants can be generated by mutagenesis techniques, including those applied to polynucleotides, cells, or organisms. The variants can contain nucleotide substitutions, deletions, inversions and insertions. Variation can occur in either or both the coding and non-coding regions. The variations can produce both conservative and non-conservative amino acid substitutions (as compared in the encoded product). Orthologs, homologs, allelic variants, and splice variants can be identified using methods known in the art. These variants normally comprise a nucleotide sequence encoding a polypeptide that is 50% or more, about 55% or more, often about 70-75% or more or about 80-85% or more, and sometimes about 90-95% or more identical to the amino acid sequences of target polypeptides or a fragment thereof. Such nucleic acid molecules can readily be identified as being able to hybridize under stringent conditions to a nucleotide sequence in SEQ ID NO's:1-10 or a fragment of this sequence. Nucleic acid molecules corresponding to orthologs, homologs, and allelic variants of a nucleotide sequence in SEQ ID NO's:1-10 can further be identified by mapping the sequence to the same chromosome or locus as the nucleotide sequence in SEQ ID NO's:1-10.

[0090] Also, substantially identical nucleotide sequences may include codons that are altered with respect to the naturally occurring sequence for enhancing expression of a target polypeptide in a particular expression system. For example, the nucleic acid can be one in which one or more codons are altered, and often 10% or more or 20% or more of the codons are altered for optimized expression in bacteria (*e.g.*, *E. coli.*), yeast (*e.g.*, *S. cerevisiae*), human (*e.g.*, 293 cells), insect, or rodent (*e.g.*, hamster) cells.

Methods for Identifying Subjects at Risk of Osteoporosis and Risk of Osteoporosis in a Subject

[0091] Methods for prognosing and diagnosing low BMD and its related disorders (*e.g.*, osteoporosis) are included herein. These methods include detecting the presence or absence of one or more polymorphic variations in a nucleotide sequence associated with low BMD, such as variants in or around the loci set forth herein, or a substantially identical sequence thereof, in a sample from a subject, where the presence of a polymorphic variant described herein is indicative of a risk of low BMD or one or more low BMD related disorders (*e.g.*, osteoporosis). Determining a risk of osteoporosis refers to determining whether an individual is at an increased risk of osteoporosis (*e.g.*, intermediate risk or higher risk).

[0092] Thus, featured herein is a method for identifying a subject who is at risk of osteoporosis, which comprises detecting low BMD-associated aberration in a nucleic acid sample from the subject. An embodiment is a method for detecting a risk of osteoporosis in a subject, which comprises detecting the presence or absence of a polymorphic variation associated with low BMD at a polymorphic site in a

nucleotide sequence in a nucleic acid sample from a subject, where the nucleotide sequence comprises a polynucleotide sequence selected from the group consisting of: (a) a nucleotide sequence of SEQ ID NO's:1-10; (b) a nucleotide sequence which encodes a polypeptide consisting of an amino acid sequence encoded by a nucleotide sequence of SEQ ID NO's:1-10; (c) a nucleotide sequence which encodes a polypeptide that is 90% or more identical to an amino acid sequence encoded by a nucleotide sequence of SEQ ID NO's:1-10, or a nucleotide sequence about 90% or more identical to a nucleotide sequence of SEQ ID NO's:1-10; and (d) a fragment of a nucleotide sequence of (a), (b), or (c) comprising the polymorphic site; whereby the presence of the polymorphic variation is indicative of a predisposition to osteoporosis in the subject. In certain embodiments, polymorphic variants at the positions described herein are detected for determining a risk of osteoporosis, and polymorphic variants at positions in linkage disequilibrium with these positions are detected for determining a risk of osteoporosis. As used herein, "SEQ ID NO's:1-10" refers to individual sequences in SEQ ID NO: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, and/or 12.

[0093] Results from prognostic tests may be combined with other test results to diagnose osteoporosis. For example, prognostic results may be gathered, an initial diagnostic test may be ordered based on a determined predisposition to low BMD, and the results of the analysis may be utilized to diagnose osteoporosis. Also osteoporosis diagnostic methods can be developed from studies used to generate prognostic/diagnostic methods in which populations are stratified into subpopulations having different progressions of osteoporosis. In another embodiment, prognostic results may be gathered; a patient's risk factors for developing osteoporosis analyzed (*e.g.*, age, race, family history, age of menopause); and an initial diagnostic test may be ordered based on a determined predisposition to low BMD.

Risk factors believed to be associated with low BMD include personal history of fracture after age 50; current low bone mass; history of fracture in a 1° relative; being female; being thin and/or having a small frame; low body weight; advanced age; a family history of osteoporosis; estrogen deficiency, especially as a result of menopause which is early or surgically induced; abnormal absence of menstrual periods (amenorrhea); anorexia nervosa; low lifetime calcium intake; use of certain medications, such as corticosteroids and anticonvulsants; low testosterone levels in men; an inactive lifestyle; current cigarette smoking; excessive use of alcohol; being Caucasian or Asian, although African Americans and Hispanic Americans are at significant risk as well. (See National Osteoporosis Foundation; <http://www.nof.org/osteoporosis/stats.htm>).

In an alternative embodiment, the results from predisposition analyses described herein may be combined with other test results indicative of osteoporosis, which were previously, concurrently, or

subsequently gathered with respect to the predisposition testing. In these embodiments, the combination of the prognostic test results with other test results can be probative of osteoporosis, and the combination can be utilized as an osteoporosis diagnostic. The results of any test indicative of osteoporosis known in the art may be combined with the methods described herein. Examples of such tests are bone density tests that measure bone density in various sites of the body. Such methods include the measurement of the radiodensity of skeletal radiographs, quantitative computerized tomography, single energy photon absorptiometry, and dual-energy photon absorptiometry. Diagnostic techniques among those useful herein are described in W. A. Peck et al., *Physician's Resource Manual on Osteoporosis* (1987), published by the National Osteoporosis Foundation (incorporated by reference herein).

[0094] Risk of low BMD sometimes is expressed as a probability, such as an odds ratio, percentage, or risk factor. The risk sometimes is expressed as a relative risk with respect to a population average risk of low BMD, and sometimes is expressed as a relative risk with respect to the lowest risk group. Such relative risk assessments often are based upon penetrance values determined by statistical methods and are particularly useful to clinicians and insurance companies for assessing risk of osteoporosis (*e.g.*, a clinician can target appropriate detection, prevention and therapeutic regimens to a patient after determining the patient's risk of osteoporosis, and an insurance company can fine tune actuarial tables based upon population genotype assessments of osteoporosis risk). Risk of osteoporosis sometimes is expressed as an odds ratio, which is the odds of a particular person having a genotype has or will develop osteoporosis with respect to another genotype group (*e.g.*, the most disease protective genotype or population average). The risk often is based upon the presence or absence of one or more polymorphic variants described herein, and also may be based in part upon phenotypic traits of the individual being tested. In an embodiment, two or more polymorphic variations are detected in a *CETP*, *PROLA*, *GRID2*, *PDE4D* or *GPX3/TNIP1* locus. In certain embodiments, 3 or more, or 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19 or 20 or more polymorphic variants are detected in the sample. Methods for calculating risk based upon patient data are well known (*see, e.g.*, Agresti, *Categorical Data Analysis*, 2nd Ed. 2002. Wiley). Allelotyping and genotyping analyses may be carried out in populations other than those exemplified herein to enhance the predictive power of the prognostic method.

[0095] The nucleic acid sample typically is isolated from a biological sample obtained from a subject. For example, nucleic acid can be isolated from blood, saliva, sputum, urine, cell scrapings, and biopsy tissue. The nucleic acid sample can be isolated from a biological sample using standard techniques, such as the technique described in Example 2. As used herein, the term "subject" refers primarily to humans but also refers to other mammals such as dogs, cats, and ungulates (*e.g.*, cattle, sheep, and swine). Subjects also include avians (*e.g.*, chickens and turkeys), reptiles, and fish (*e.g.*,

salmon), as embodiments described herein can be adapted to nucleic acid samples isolated from any of these organisms. The nucleic acid sample may be isolated from the subject and then directly utilized in a method for determining the presence of a polymorphic variant, or alternatively, the sample may be isolated and then stored (*e.g.*, frozen) for a period of time before being subjected to analysis.

[0096] The presence or absence of a polymorphic variant is determined using one or both chromosomal complements represented in the nucleic acid sample. Determining the presence or absence of a polymorphic variant in both chromosomal complements represented in a nucleic acid sample from a subject having a copy of each chromosome is useful for determining the zygosity of an individual for the polymorphic variant (*i.e.*, whether the individual is homozygous or heterozygous for the polymorphic variant). Any oligonucleotide-based diagnostic may be utilized to determine whether a sample includes the presence or absence of a polymorphic variant in a sample. For example, primer extension methods, ligase sequence determination methods (*e.g.*, U.S. Pat. Nos. 5,679,524 and 5,952,174, and WO 01/27326), mismatch sequence determination methods (*e.g.*, U.S. Pat. Nos. 5,851,770; 5,958,692; 6,110,684; and 6,183,958), microarray sequence determination methods, restriction fragment length polymorphism (RFLP), single strand conformation polymorphism detection (SSCP) (*e.g.*, U.S. Pat. Nos. 5,891,625 and 6,013,499), PCR-based assays (*e.g.*, TAQMAN[®] PCR System (Applied Biosystems)), and nucleotide sequencing methods may be used.

[0097] Oligonucleotide extension methods typically involve providing a pair of oligonucleotide primers in a polymerase chain reaction (PCR) or in other nucleic acid amplification methods for the purpose of amplifying a region from the nucleic acid sample that comprises the polymorphic variation. One oligonucleotide primer is complementary to a region 3' of the polymorphism and the other is complementary to a region 5' of the polymorphism. A PCR primer pair may be used in methods disclosed in U.S. Pat. Nos. 4,683,195; 4,683,202, 4,965,188; 5,656,493; 5,998,143; 6,140,054; WO 01/27327; and WO 01/27329 for example. PCR primer pairs may also be used in any commercially available machines that perform PCR, such as any of the GENEAMP[®] Systems available from Applied Biosystems. Also, those of ordinary skill in the art will be able to design oligonucleotide primers based upon a *CETP*, *PROL4*, *GRID2*, *PDE4D* or *GPX3/TNIP1* nucleotide sequence using knowledge available in the art.

[0098] Also provided is an extension oligonucleotide that hybridizes to the amplified fragment adjacent to the polymorphic variation. As used herein, the term "adjacent" refers to the 3' end of the extension oligonucleotide being often 1 nucleotide from the 5' end of the polymorphic site, and sometimes 2, 3, 4, 5, 6, 7, 8, 9, or 10 nucleotides from the 5' end of the polymorphic site, in the nucleic acid when the extension oligonucleotide is hybridized to the nucleic acid. The extension oligonucleotide

then is extended by one or more nucleotides, and the number and/or type of nucleotides that are added to the extension oligonucleotide determine whether the polymorphic variant is present. Oligonucleotide extension methods are disclosed, for example, in U.S. Pat. Nos. 4,656,127; 4,851,331; 5,679,524; 5,834,189; 5,876,934; 5,908,755; 5,912,118; 5,976,802; 5,981,186; 6,004,744; 6,013,431; 6,017,702; 6,046,005; 6,087,095; 6,210,891; and WO 01/20039. Oligonucleotide extension methods using mass spectrometry are described, for example, in U.S. Pat. Nos. 5,547,835; 5,605,798; 5,691,141; 5,849,542; 5,869,242; 5,928,906; 6,043,031; and 6,194,144, and a method often utilized is described herein in Example 2.

[0099] A microarray can be utilized for determining whether a polymorphic variant is present or absent in a nucleic acid sample. A microarray may include any oligonucleotides described herein, and methods for making and using oligonucleotide microarrays suitable for diagnostic use are disclosed in U.S. Pat. Nos. 5,492,806; 5,525,464; 5,589,330; 5,695,940; 5,849,483; 6,018,041; 6,045,996; 6,136,541; 6,142,681; 6,156,501; 6,197,506; 6,223,127; 6,225,625; 6,229,911; 6,239,273; WO 00/52625; WO 01/25485; and WO 01/29259. The microarray typically comprises a solid support and the oligonucleotides may be linked to this solid support by covalent bonds or by non-covalent interactions. The oligonucleotides may also be linked to the solid support directly or by a spacer molecule. A microarray may comprise one or more oligonucleotides complementary to a polymorphic site set forth herein.

[0100] A kit also may be utilized for determining whether a polymorphic variant is present or absent in a nucleic acid sample. A kit often comprises one or more pairs of oligonucleotide primers useful for amplifying a fragment of a nucleotide sequence of SEQ ID NO's:1-10 or a substantially identical sequence thereof, where the fragment includes a polymorphic site. The kit sometimes comprises a polymerizing agent, for example, a thermostable nucleic acid polymerase such as one disclosed in U.S. Pat. Nos. 4,889,818 or 6,077,664. Also, the kit often comprises an elongation oligonucleotide that hybridizes to a *CETP*, *PROL4*, *GRID2*, *PDE4D* or *GPX3/TNIP1* nucleotide sequence in a nucleic acid sample adjacent to the polymorphic site. Where the kit includes an elongation oligonucleotide, it also often comprises chain elongating nucleotides, such as dATP, dTTP, dGTP, dCTP, and dITP, including analogs of dATP, dTTP, dGTP, dCTP and dITP, provided that such analogs are substrates for a thermostable nucleic acid polymerase and can be incorporated into a nucleic acid chain elongated from the extension oligonucleotide. Along with chain elongating nucleotides would be one or more chain terminating nucleotides such as ddATP, ddTTP, ddGTP, ddCTP, and the like. In an embodiment, the kit comprises one or more oligonucleotide primer pairs, a polymerizing agent, chain elongating nucleotides,

at least one elongation oligonucleotide, and one or more chain terminating nucleotides. Kits optionally include buffers, vials, microtiter plates, and instructions for use.

[0101] An individual identified as being at risk of osteoporosis may be heterozygous or homozygous with respect to the allele associated with low BMD. A subject homozygous for an allele associated with low BMD is at a comparatively high risk of osteoporosis, a subject heterozygous for an allele associated with low BMD is at a comparatively intermediate risk of osteoporosis, and a subject homozygous for an allele associated with normal or high BMD levels (*i.e.*, a decreased risk of low BMD) is at a comparatively low risk of osteoporosis. A genotype may be assessed for a complementary strand, such that the complementary nucleotide at a particular position is detected.

[0102] Also featured are methods for determining risk of osteoporosis and/or identifying a subject at risk of osteoporosis by contacting a polypeptide or protein encoded by a *CETP*, *PROL4*, *GRID2*, *PDE4D* or *GPX3/TNIP1* nucleotide sequence from a subject with an antibody that specifically binds to an epitope associated with increased risk of osteoporosis in the polypeptide. In an embodiment, the antibody specifically binds to an epitope comprising an arginine at position 120 in a *PROL4* polypeptide.

Applications of Prognostic and Diagnostic Results to Pharmacogenomic Methods

[0103] Pharmacogenomics is a discipline that involves tailoring a treatment for a subject according to the subject's genotype as a particular treatment regimen may exert a differential effect depending upon the subject's genotype. For example, based upon the outcome of a prognostic test described herein, a clinician or physician may target pertinent information and preventative or therapeutic treatments to a subject who would be benefited by the information or treatment and avoid directing such information and treatments to a subject who would not be benefited (*e.g.*, the treatment has no therapeutic effect and/or the subject experiences adverse side effects).

[0104] The following is an example of a pharmacogenomic embodiment. A particular treatment regimen can exert a differential effect depending upon the subject's genotype. Where a candidate therapeutic exhibits a significant interaction with a major allele and a comparatively weak interaction with a minor allele (*e.g.*, an order of magnitude or greater difference in the interaction), such a therapeutic typically would not be administered to a subject genotyped as being homozygous for the minor allele, and sometimes not administered to a subject genotyped as being heterozygous for the minor allele. In another example, where a candidate therapeutic is not significantly toxic when administered to subjects who are homozygous for a major allele but is comparatively toxic when administered to subjects heterozygous or homozygous for a minor allele, the candidate therapeutic is not typically administered to subjects who are genotyped as being heterozygous or homozygous with respect to the minor allele.

[0105] The methods described herein are applicable to pharmacogenomic methods for preventing, alleviating or treating low BMD conditions such as osteoporosis. For example, a nucleic acid sample from an individual may be subjected to a prognostic test described herein. Where one or more polymorphic variations associated with low BMD are identified in a subject, information for preventing or treating osteoporosis and/or one or more osteoporosis treatment regimens then may be prescribed to that subject.

[0106] In certain embodiments, a treatment or preventative regimen is specifically prescribed and/or administered to individuals who will most benefit from it based upon their risk of developing osteoporosis assessed by the methods described herein. Thus, provided are methods for identifying a subject predisposed to osteoporosis and then prescribing a therapeutic or preventative regimen to individuals identified as having a predisposition. Thus, certain embodiments are directed to a method for increasing BMD levels or otherwise treating osteoporosis in a subject, which comprises: detecting the presence or absence of a polymorphic variant associated with low BMD in a nucleotide sequence in a nucleic acid sample from a subject, where the nucleotide sequence comprises a polynucleotide sequence selected from the group consisting of: (a) a nucleotide sequence of SEQ ID NO's:1-10; (b) a nucleotide sequence which encodes a polypeptide consisting of an amino acid sequence encoded by a nucleotide sequence of SEQ ID NO's:1-10; (c) a nucleotide sequence which encodes a polypeptide that is 90% or more identical to an amino acid sequence encoded by a nucleotide sequence of SEQ ID NO's:1-10, or a nucleotide sequence about 90% or more identical to a nucleotide sequence of SEQ ID NO's:1-10; and (d) a fragment of a polynucleotide sequence of (a), (b), or (c); and prescribing or administering a treatment regimen to a subject from whom the sample originated where the presence of a polymorphic variation associated with low BMD is detected in the nucleotide sequence. In these methods, predisposition results may be utilized in combination with other test results to diagnose low BMD associated conditions, such as osteoporosis.

[0107] Certain preventative treatments often are prescribed to subjects having a predisposition to osteoporosis and where the subject is diagnosed with low BMD or is diagnosed as having symptoms indicative of early stage osteoporosis. Established diagnostic techniques use x-ray and ultrasonography to measure skeletal parameters of bone size, volume and mineral density to predict fracture risk and to assess response to therapy. Such measurements give a "static" value which can be compared to normal values to aid diagnosis of low bone mass and fracture risk (Schott, Cornier et al. 1998). The World Health Organization defines osteoporosis as a bone mineral density level more than 2.5 standard deviations below the young normal mean. The various techniques used to measure bone mineral density include, a) Dual energy X-ray absorptiometry (DXA) - used to measure bone mass at the lumbar spine and hip, but it can also be applied to measuring total skeletal bone mass, soft-tissue composition and other

regional bone measurements. DXA is considered the "gold standard" for BMD measurement; b) high-resolution quantitative computed tomography (QCT) - highly sensitive, accurate and specific spinal measurements. This technique is more costly, not widely available and involves higher radiation doses than other techniques; c) single-energy x-ray absorptiometry (SXA) - provides accurate radius BMD measurements; d) quantitative ultrasound (QUS) - new and promising technique which may have applications in both BMD measurement and assessment of architectural deterioration of bone tissue. Recent studies suggest QUS of calcaneus bone predicts hip fracture as well as DXA (Hans, Dargent-Molina et al. 1996).

An alternative method to predict fracture independently of bone mass is to measure bone turnover. High turnover (bone resorption and formation) is associated with rapid bone loss and is likely to contribute to micro-architectural deterioration (Ross and Knowlton 1998). This is a "dynamic" measurement which is assessed with biochemical markers in urine or serum and can be used effectively in therapy monitoring in preference to BMD measurements. When used in combination with bone mass assessment, biomarkers can provide more accurate fracture predictions over bone mass measurement alone. Osteoporosis-related biomarkers for bone resorption include deoxypyridinoline crosslinks, and osteoporosis-related biomarkers for bone formation include bone alkaline phosphatase and osteocalcin. Some of these biomarkers have been developed for use in diagnostic kits. The current challenge is to reduce the variability of the measurements and improve their reliability and applicability.

[0108] The treatment sometimes is preventative (*e.g.*, is prescribed or administered to reduce the probability that a low BMD associated condition arises or progresses), sometimes is therapeutic, and sometimes delays, alleviates or halts the progression of a low BMD associated condition. Any known preventative or therapeutic treatment for alleviating or preventing the occurrence of a low BMD associated disorder is prescribed and/or administered. Preventative treatment for osteoporosis is most effective at the time when bone loss is increasing and before the bones have become fragile and prone to fracturing. Strategies for the prevention of this disease include development of bone density in early adulthood (*i.e.*, building strong bones during childhood and adolescence), and minimization of bone loss in later life. Changes in lifestyle, nutrition and hormonal factors have been shown to affect bone loss. Specifically, a balanced diet rich in calcium and vitamin D, weight-bearing exercise, a healthy lifestyle with no smoking or excessive alcohol intake, and bone density testing and medication when appropriate are known to help reduce the risk of osteoporosis.

[0109] As therapeutic approaches for low BMD continue to evolve and improve, the goal of treatments for low BMD related disorders is to intervene even before clinical signs (*e.g.*, impaired glucose

tolerance, or IGT) first manifest. Thus, genetic markers associated with susceptibility to low BMD prove useful for early diagnosis, prevention and treatment of low BMD.

[0110] As osteoporosis preventative and treatment information can be specifically targeted to subjects in need thereof (*e.g.*, those at risk of low BMD or those that have early stages of osteoporosis), provided herein is a method for preventing or reducing the risk of developing osteoporosis in a subject, which comprises: (a) detecting the presence or absence of a polymorphic variation associated with low BMD at a polymorphic site in a nucleotide sequence in a nucleic acid sample from a subject; (b) identifying a subject with a predisposition to osteoporosis, whereby the presence of the polymorphic variation is indicative of a predisposition to osteoporosis in the subject; and (c) if such a predisposition is identified, providing the subject with information about methods or products to prevent osteoporosis or to delay the onset of osteoporosis. Also provided is a method of targeting information or advertising to a subpopulation of a human population based on the subpopulation being genetically predisposed to a disease or condition, which comprises: (a) detecting the presence or absence of a polymorphic variation associated with low BMD at a polymorphic site in a nucleotide sequence in a nucleic acid sample from a subject; (b) identifying the subpopulation of subjects in which the polymorphic variation is associated with low BMD; and (c) providing information only to the subpopulation of subjects about a particular product which may be obtained and consumed or applied by the subject to help prevent or delay onset of the disease or condition.

[0111] Pharmacogenomics methods also may be used to analyze and predict a response to a osteoporosis treatment or a drug. For example, if pharmacogenomics analysis indicates a likelihood that an individual will respond positively to a osteoporosis treatment with a particular drug, the drug may be administered to the individual. Conversely, if the analysis indicates that an individual is likely to respond negatively to treatment with a particular drug, an alternative course of treatment may be prescribed. A negative response may be defined as either the absence of an efficacious response or the presence of toxic side effects. The response to a therapeutic treatment can be predicted in a background study in which subjects in any of the following populations are genotyped: a population that responds favorably to a treatment regimen, a population that does not respond significantly to a treatment regimen, and a population that responds adversely to a treatment regiment (*e.g.*, exhibits one or more side effects). These populations are provided as examples and other populations and subpopulations may be analyzed. Based upon the results of these analyses, a subject is genotyped to predict whether he or she will respond favorably to a treatment regimen, not respond significantly to a treatment regimen, or respond adversely to a treatment regimen.

[0112] The tests described herein also are applicable to clinical drug trials. One or more polymorphic variants indicative of response to an agent for treating osteoporosis or to side effects to an agent for treating osteoporosis may be identified using the methods described herein. Thereafter, potential participants in clinical trials of such an agent may be screened to identify those individuals most likely to respond favorably to the drug and exclude those likely to experience side effects. In that way, the effectiveness of drug treatment may be measured in individuals who respond positively to the drug, without lowering the measurement as a result of the inclusion of individuals who are unlikely to respond positively in the study and without risking undesirable safety problems.

[0113] Thus, another embodiment is a method of selecting an individual for inclusion in a clinical trial of a treatment or drug comprising the steps of: (a) obtaining a nucleic acid sample from an individual; (b) determining the identity of a polymorphic variation which is associated with a positive response to the treatment or the drug, or at least one polymorphic variation which is associated with a negative response to the treatment or the drug in the nucleic acid sample, and (c) including the individual in the clinical trial if the nucleic acid sample contains said polymorphic variation associated with a positive response to the treatment or the drug or if the nucleic acid sample lacks said polymorphic variation associated with a negative response to the treatment or the drug. In addition, the methods described herein for selecting an individual for inclusion in a clinical trial of a treatment or drug encompass methods with any further limitation described in this disclosure, or those following, specified alone or in any combination. The polymorphic variation may be in a sequence selected individually or in any combination from the group consisting of (i) a nucleotide sequence of SEQ ID NO's:1-10; (ii) a nucleotide sequence which encodes a polypeptide consisting of an amino acid sequence encoded by a nucleotide sequence of SEQ ID NO's:1-10; (iii) a nucleotide sequence which encodes a polypeptide that is 90% or more identical to an amino acid sequence encoded by a nucleotide sequence of SEQ ID NO's:1-10, or a nucleotide sequence about 90% or more identical to a nucleotide sequence of SEQ ID NO's:1-10; and (iv) a fragment of a polynucleotide sequence of (i), (ii), or (iii) comprising the polymorphic site. The including step (c) optionally comprises administering the drug or the treatment to the individual if the nucleic acid sample contains the polymorphic variation associated with a positive response to the treatment or the drug and the nucleic acid sample lacks said biallelic marker associated with a negative response to the treatment or the drug.

[0114] Also provided herein is a method of partnering between a diagnostic/prognostic testing provider and a provider of a consumable product, which comprises: (a) the diagnostic/prognostic testing provider detects the presence or absence of a polymorphic variation associated with low BMD at a polymorphic site in a nucleotide sequence in a nucleic acid sample from a subject; (b) the

diagnostic/prognostic testing provider identifies the subpopulation of subjects in which the polymorphic variation is associated with low BMD; (c) the diagnostic/prognostic testing provider forwards information to the subpopulation of subjects about a particular product which may be obtained and consumed or applied by the subject to help prevent or delay onset of the disease or condition; and (d) the provider of a consumable product forwards to the diagnostic test provider a fee every time the diagnostic/prognostic test provider forwards information to the subject as set forth in step (c) above.

Compositions Comprising Osteoporosis-Directed Molecules

[0115] Featured herein is a composition comprising a cell from a subject having low BMD or at risk of osteoporosis and one or more molecules specifically directed and targeted to a nucleic acid comprising a *CETP*, *PROL4*, *GRID2*, *PDE4D* or *GPX3/TNIP1* nucleotide sequence or amino acid sequence. Such directed molecules include, but are not limited to, a compound that binds to a *CETP*, *PROL4*, *GRID2*, *PDE4D* or *GPX3/TNIP1* nucleotide sequence or amino acid sequence referenced herein; a nucleic acid that hybridizes to a *CETP*, *PROL4*, *GRID2*, *PDE4D* or *GPX3/TNIP1* nucleic acid under conditions of high stringency; a RNAi or siRNA molecule having a strand complementary to a *CETP*, *PROL4*, *GRID2*, *PDE4D* or *GPX3/TNIP1* nucleotide sequence; an antisense nucleic acid complementary to an RNA encoded by a *CETP*, *PROL4*, *GRID2*, *PDE4D* or *GPX3/TNIP1* nucleotide sequence; a ribozyme that hybridizes to a *CETP*, *PROL4*, *GRID2*, *PDE4D* or *GPX3/TNIP1* nucleotide sequence; a nucleic acid aptamer that specifically binds a polypeptide encoded by *CETP*, *PROL4*, *GRID2*, *PDE4D* or *GPX3/TNIP1* nucleotide sequence; and an antibody that specifically binds to a polypeptide encoded by *CETP*, *PROL4*, *GRID2*, *PDE4D* or *GPX3/TNIP1* nucleotide sequence or binds to a nucleic acid having such a nucleotide sequence. In specific embodiments, the osteoporosis directed molecule interacts with a nucleic acid or polypeptide variant associated with osteoporosis, such as variants referenced herein. In other embodiments, the osteoporosis directed molecule interacts with a polypeptide involved in a signal pathway of a polypeptide encoded by a *CETP*, *PROL4*, *GRID2*, *PDE4D* or *GPX3/TNIP1* nucleotide sequence, or a nucleic acid comprising such a nucleotide sequence.

[0116] Compositions sometimes include an adjuvant known to stimulate an immune response, and in certain embodiments, an adjuvant that stimulates a T-cell lymphocyte response. Adjuvants are known, including but not limited to an aluminum adjuvant (e.g., aluminum hydroxide); a cytokine adjuvant or adjuvant that stimulates a cytokine response (e.g., interleukin (IL)-12 and/or γ -interferon cytokines); a Freund-type mineral oil adjuvant emulsion (e.g., Freund's complete or incomplete adjuvant); a synthetic lipid compound; a copolymer adjuvant (e.g., TitreMax); a saponin; Quil A; a liposome; an oil-in-water emulsion (e.g., an emulsion stabilized by Tween 80 and pluronic polyoxyethylene/polyoxypropylene block

copolymer (Syntex Adjuvant Formulation); TitreMax; detoxified endotoxin (MPL) and mycobacterial cell wall components (TDW, CWS) in 2% squalene (Ribi Adjuvant System)); a muramyl dipeptide; an immune-stimulating complex (ISCOM, *e.g.*, an Ag-modified saponin/cholesterol micelle that forms stable cage-like structure); an aqueous phase adjuvant that does not have a depot effect (*e.g.*, Gerbu adjuvant); a carbohydrate polymer (*e.g.*, AdjuPrime); L-tyrosine; a manide-oleate compound (*e.g.*, Montanide); an ethylene-vinyl acetate copolymer (*e.g.*, Elvax 40W1,2); or lipid A, for example. Such compositions are useful for generating an immune response against an osteoporosis directed molecule (*e.g.*, an HLA-binding subsequence within a polypeptide encoded by a *CETP*, *PROL4*, *GRID2*, *PDE4D* or *GPX3/TNIP1* nucleotide sequence). In such methods, a peptide having an amino acid subsequence of a polypeptide encoded by a *CETP*, *PROL4*, *GRID2*, *PDE4D* or *GPX3/TNIP1* nucleotide sequence is delivered to a subject, where the subsequence binds to an HLA molecule and induces a CTL lymphocyte response. The peptide sometimes is delivered to the subject as an isolated peptide or as a minigene in a plasmid that encodes the peptide. Methods for identifying HLA-binding subsequences in such polypeptides are known (see *e.g.*, publication WO02/20616 and PCT application US98/01373 for methods of identifying such sequences).

[0117] The cell may be in a group of cells cultured *in vitro* or in a tissue maintained *in vitro* or present in an animal *in vivo* (*e.g.*, a rat, mouse, ape or human). In certain embodiments, a composition comprises a component from a cell such as a nucleic acid molecule (*e.g.*, genomic DNA), a protein mixture or isolated protein, for example. The aforementioned compositions have utility in diagnostic, prognostic and pharmacogenomic methods described previously and in osteoporosis therapeutics described hereafter. Certain osteoporosis directed molecules are described in greater detail below.

Compounds

[0118] Compounds can be obtained using any of the numerous approaches in combinatorial library methods known in the art, including: biological libraries; peptoid libraries (libraries of molecules having the functionalities of peptides, but with a novel, non-peptide backbone which are resistant to enzymatic degradation but which nevertheless remain bioactive (see, *e.g.*, Zuckermann *et al.*, J. Med. Chem. 37: 2678-85 (1994)); spatially addressable parallel solid phase or solution phase libraries; synthetic library methods requiring deconvolution; "one-bead one-compound" library methods; and synthetic library methods using affinity chromatography selection. Biological library and peptoid library approaches are typically limited to peptide libraries, while the other approaches are applicable to peptide, non-peptide oligomer or small molecule libraries of compounds (Lam, Anticancer Drug Des. 12: 145, (1997)). Examples of methods for synthesizing molecular libraries are described, for example, in DeWitt *et al.*,

Proc. Natl. Acad. Sci. U.S.A. 90: 6909 (1993); Erb *et al.*, Proc. Natl. Acad. Sci. USA 91: 11422 (1994); Zuckermann *et al.*, J. Med. Chem. 37: 2678 (1994); Cho *et al.*, Science 261: 1303 (1993); Carrell *et al.*, Angew. Chem. Int. Ed. Engl. 33: 2059 (1994); Carell *et al.*, Angew. Chem. Int. Ed. Engl. 33: 2061 (1994); and in Gallop *et al.*, J. Med. Chem. 37: 1233 (1994).

[0119] Libraries of compounds may be presented in solution (*e.g.*, Houghten, Biotechniques 13: 412-421 (1992)), or on beads (Lam, Nature 354: 82-84 (1991)), chips (Fodor, Nature 364: 555-556 (1993)), bacteria or spores (Ladner, United States Patent No. 5,223,409), plasmids (Cull *et al.*, Proc. Natl. Acad. Sci. USA 89: 1865-1869 (1992)) or on phage (Scott and Smith, Science 249: 386-390 (1990); Devlin, Science 249: 404-406 (1990); Cwirla *et al.*, Proc. Natl. Acad. Sci. 87: 6378-6382 (1990); Felici, J. Mol. Biol. 222: 301-310 (1991); Ladner *supra.*).

[0120] A compound sometimes alters expression and sometimes alters activity of a polypeptide target and may be a small molecule. Small molecules include, but are not limited to, peptides, peptidomimetics (*e.g.*, peptoids), amino acids, amino acid analogs, polynucleotides, polynucleotide analogs, nucleotides, nucleotide analogs, organic or inorganic compounds (*i.e.*, including heteroorganic and organometallic compounds) having a molecular weight less than about 10,000 grams per mole, organic or inorganic compounds having a molecular weight less than about 5,000 grams per mole, organic or inorganic compounds having a molecular weight less than about 1,000 grams per mole, organic or inorganic compounds having a molecular weight less than about 500 grams per mole, and salts, esters, and other pharmaceutically acceptable forms of such compounds.

Antisense Nucleic Acid Molecules, Ribozymes, RNAi, siRNA and Modified Nucleic Acid Molecules

[0121] An "antisense" nucleic acid refers to a nucleotide sequence complementary to a "sense" nucleic acid encoding a polypeptide, *e.g.*, complementary to the coding strand of a double-stranded cDNA molecule or complementary to an mRNA sequence. The antisense nucleic acid can be complementary to an entire coding strand (*e.g.*, SEQ ID NO: 7-13), or to a portion thereof or a substantially identical sequence thereof. In another embodiment, the antisense nucleic acid molecule is antisense to a "noncoding region" of the coding strand of a nucleotide sequence (*e.g.*, 5' and 3' untranslated regions in SEQ ID NO's:1-5).

[0122] An antisense nucleic acid can be designed such that it is complementary to the entire coding region of an mRNA encoded by a nucleotide sequence (*e.g.*, SEQ ID NO's:1-10), and often the antisense nucleic acid is an oligonucleotide antisense to only a portion of a coding or noncoding region of the mRNA. For example, the antisense oligonucleotide can be complementary to the region surrounding the

translation start site of the mRNA, *e.g.*, between the -10 and +10 regions of the target gene nucleotide sequence of interest. An antisense oligonucleotide can be, for example, about 7, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65, 70, 75, 80, or more nucleotides in length. The antisense nucleic acids, which include the ribozymes described hereafter, can be designed to target a *CETP*, *PROL4*, *GRID2*, *PDE4D* or *GPX3/TNIP1* nucleotide sequence, often a variant associated with low BMD, or a substantially identical sequence thereof. Among the variants, minor alleles and major alleles can be targeted, and those associated with a higher risk of osteoporosis are often designed, tested, and administered to subjects.

[0123] An antisense nucleic acid can be constructed using chemical synthesis and enzymatic ligation reactions using standard procedures. For example, an antisense nucleic acid (*e.g.*, an antisense oligonucleotide) can be chemically synthesized using naturally occurring nucleotides or variously modified nucleotides designed to increase the biological stability of the molecules or to increase the physical stability of the duplex formed between the antisense and sense nucleic acids, *e.g.*, phosphorothioate derivatives and acridine substituted nucleotides can be used. Antisense nucleic acid also can be produced biologically using an expression vector into which a nucleic acid has been subcloned in an antisense orientation (*i.e.*, RNA transcribed from the inserted nucleic acid will be of an antisense orientation to a target nucleic acid of interest, described further in the following subsection).

[0124] When utilized as therapeutics, antisense nucleic acids typically are administered to a subject (*e.g.*, by direct injection at a tissue site) or generated in situ such that they hybridize with or bind to cellular mRNA and/or genomic DNA encoding a polypeptide and thereby inhibit expression of the polypeptide, for example, by inhibiting transcription and/or translation. Alternatively, antisense nucleic acid molecules can be modified to target selected cells and then are administered systemically. For systemic administration, antisense molecules can be modified such that they specifically bind to receptors or antigens expressed on a selected cell surface, for example, by linking antisense nucleic acid molecules to peptides or antibodies which bind to cell surface receptors or antigens. Antisense nucleic acid molecules can also be delivered to cells using the vectors described herein. Sufficient intracellular concentrations of antisense molecules are achieved by incorporating a strong promoter, such as a pol II or pol III promoter, in the vector construct.

[0125] Antisense nucleic acid molecules sometimes are α -anomeric nucleic acid molecules. An α -anomeric nucleic acid molecule forms specific double-stranded hybrids with complementary RNA in which, contrary to the usual β -units, the strands run parallel to each other (Gaultier *et al.*, *Nucleic Acids Res.* 15: 6625-6641 (1987)). Antisense nucleic acid molecules can also comprise a 2'-*o*-methylribonucleotide (Inoue *et al.*, *Nucleic Acids Res.* 15: 6131-6148 (1987)) or a chimeric RNA-DNA

analogue (Inoue *et al.*, FEBS Lett. 215: 327-330 (1987)). Antisense nucleic acids sometimes are composed of DNA or PNA or any other nucleic acid derivatives described previously.

[0126] In another embodiment, an antisense nucleic acid is a ribozyme. A ribozyme having specificity for a *CETP*, *PROL4*, *GRID2*, *PDE4D* or *GPX3/TNIP1* nucleotide sequence can include one or more sequences complementary to such a nucleotide sequence, and a sequence having a known catalytic region responsible for mRNA cleavage (see *e.g.*, U.S. Pat. No. 5,093,246 or Haselhoff and Gerlach, Nature 334: 585-591 (1988)). For example, a derivative of a Tetrahymena L-19 IVS RNA is sometimes utilized in which the nucleotide sequence of the active site is complementary to the nucleotide sequence to be cleaved in a mRNA (see *e.g.*, Cech *et al.* U.S. Patent No. 4,987,071; and Cech *et al.* U.S. Patent No. 5,116,742). Also, target mRNA sequences can be used to select a catalytic RNA having a specific ribonuclease activity from a pool of RNA molecules (see *e.g.*, Bartel & Szostak, Science 261: 1411-1418 (1993)).

[0127] Osteoporosis directed molecules include in certain embodiments nucleic acids that can form triple helix structures with a *CETP*, *PROL4*, *GRID2*, *PDE4D* or *GPX3/TNIP1* nucleotide sequence or a substantially identical sequence thereof, especially one that includes a regulatory region that controls expression of a polypeptide. Gene expression can be inhibited by targeting nucleotide sequences complementary to the regulatory region of a nucleotide sequence referenced herein or a substantially identical sequence (*e.g.*, promoter and/or enhancers) to form triple helical structures that prevent transcription of a gene in target cells (see *e.g.*, Helene, Anticancer Drug Des. 6(6): 569-84 (1991); Helene *et al.*, Ann. N.Y. Acad. Sci. 660: 27-36 (1992); and Maher, Bioassays 14(12): 807-15 (1992). Potential sequences that can be targeted for triple helix formation can be increased by creating a so-called "switchback" nucleic acid molecule. Switchback molecules are synthesized in an alternating 5'-3', 3'-5' manner, such that they base pair with first one strand of a duplex and then the other, eliminating the necessity for a sizeable stretch of either purines or pyrimidines to be present on one strand of a duplex.

[0128] Osteoporosis directed molecules include RNAi and siRNA nucleic acids. Gene expression may be inhibited by the introduction of double-stranded RNA (dsRNA), which induces potent and specific gene silencing, a phenomenon called RNA interference or RNAi. See, *e.g.*, Fire *et al.*, US Patent Number 6,506,559; Tuschl *et al.* PCT International Publication No. WO 01/75164; Kay *et al.* PCT International Publication No. WO 03/010180A1; or Boshier JM, Labouesse, Nat Cell Biol 2000 Feb;2(2):E31-6. This process has been improved by decreasing the size of the double-stranded RNA to 20-24 base pairs (to create small-interfering RNAs or siRNAs) that "switched off" genes in mammalian cells without initiating an acute phase response, *i.e.*, a host defense mechanism that often results in cell death (see, *e.g.*, Caplen *et al.* Proc Natl Acad Sci U S A. 2001 Aug 14;98(17):9742-7 and Elbashir *et al.*

Methods 2002 Feb;26(2):199-213). There is increasing evidence of post-transcriptional gene silencing by RNA interference (RNAi) for inhibiting targeted expression in mammalian cells at the mRNA level, in human cells. There is additional evidence of effective methods for inhibiting the proliferation and migration of tumor cells in human patients, and for inhibiting metastatic cancer development (see, *e.g.*, U.S. Patent Application No. US2001000993183; Caplen *et al.* Proc Natl Acad Sci U S A; and Abderrahmani *et al.* Mol Cell Biol 2001 Nov 21(21):7256-67).

[0129] An “siRNA” or “RNAi” refers to a nucleic acid that forms a double stranded RNA and has the ability to reduce or inhibit expression of a gene or target gene when the siRNA is delivered to or expressed in the same cell as the gene or target gene. “siRNA” refers to short double-stranded RNA formed by the complementary strands. Complementary portions of the siRNA that hybridize to form the double stranded molecule often have substantial or complete identity to the target molecule sequence. In one embodiment, an siRNA refers to a nucleic acid that has substantial or complete identity to a target gene and forms a double stranded siRNA.

[0130] When designing the siRNA molecules, the targeted region often is selected from a given DNA sequence beginning 50 to 100 nucleotides downstream of the start codon. See, *e.g.*, Elbashir *et al.*, Methods 26:199-213 (2002). Initially, 5' or 3' UTRs and regions nearby the start codon were avoided assuming that UTR-binding proteins and/or translation initiation complexes may interfere with binding of the siRNP or RISC endonuclease complex. Sometimes regions of the target 23 nucleotides in length conforming to the sequence motif AA(N19)TT (N, an nucleotide), and regions with approximately 30% to 70% G/C-content (often about 50% G/C-content) often are selected. If no suitable sequences are found, the search often is extended using the motif NA(N21). The sequence of the sense siRNA sometimes corresponds to (N19) TT or N21 (position 3 to 23 of the 23-nt motif), respectively. In the latter case, the 3' end of the sense siRNA often is converted to TT. The rationale for this sequence conversion is to generate a symmetric duplex with respect to the sequence composition of the sense and antisense 3' overhangs. The antisense siRNA is synthesized as the complement to position 1 to 21 of the 23-nt motif. Because position 1 of the 23-nt motif is not recognized sequence-specifically by the antisense siRNA, the 3'-most nucleotide residue of the antisense siRNA can be chosen deliberately. However, the penultimate nucleotide of the antisense siRNA (complementary to position 2 of the 23-nt motif) often is complementary to the targeted sequence. For simplifying chemical synthesis, TT often is utilized. siRNAs corresponding to the target motif NAR(N17)YNN, where R is purine (A,G) and Y is pyrimidine (C,U), often are selected. Respective 21 nucleotide sense and antisense siRNAs often begin with a purine nucleotide and can also be expressed from pol III expression vectors without a change in

targeting site. Expression of RNAs from pol III promoters often is efficient when the first transcribed nucleotide is a purine.

[0131] The sequence of the siRNA can correspond to the full length target gene, or a subsequence thereof. Often, the siRNA is about 15 to about 50 nucleotides in length (*e.g.*, each complementary sequence of the double stranded siRNA is 15-50 nucleotides in length, and the double stranded siRNA is about 15-50 base pairs in length, sometimes about 20-30 nucleotides in length or about 20-25 nucleotides in length, *e.g.*, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, or 30 nucleotides in length. The siRNA sometimes is about 21 nucleotides in length. Methods of using siRNA are well known in the art, and specific siRNA molecules may be purchased from a number of companies including Dharmacon Research, Inc. An siRNA molecule sometimes is of a different chemical composition as compared to native RNA that imparts increased stability in cells (*e.g.*, decreased susceptibility to degradation), and sometimes includes one or more modifications in siSTABLE RNA described at the [http address www.dharmacon.com](http://www.dharmacon.com).

[0132] Antisense, ribozyme, RNAi and siRNA nucleic acids can be altered to form modified nucleic acid molecules. The nucleic acids can be altered at base moieties, sugar moieties or phosphate backbone moieties to improve stability, hybridization, or solubility of the molecule. For example, the deoxyribose phosphate backbone of nucleic acid molecules can be modified to generate peptide nucleic acids (see Hyrup *et al.*, Bioorganic & Medicinal Chemistry 4 (1): 5-23 (1996)). As used herein, the terms “peptide nucleic acid” or “PNA” refers to a nucleic acid mimic such as a DNA mimic, in which the deoxyribose phosphate backbone is replaced by a pseudopeptide backbone and only the four natural nucleobases are retained. The neutral backbone of a PNA can allow for specific hybridization to DNA and RNA under conditions of low ionic strength. Synthesis of PNA oligomers can be performed using standard solid phase peptide synthesis protocols as described, for example, in Hyrup *et al.*, (1996) *supra* and Perry-O’Keefe *et al.*, Proc. Natl. Acad. Sci. 93: 14670-675 (1996).

[0133] PNA nucleic acids can be used in prognostic, diagnostic, and therapeutic applications. For example, PNAs can be used as antisense or antigene agents for sequence-specific modulation of gene expression by, for example, inducing transcription or translation arrest or inhibiting replication. PNA nucleic acid molecules can also be used in the analysis of single base pair mutations in a gene, (*e.g.*, by PNA-directed PCR clamping); as “artificial restriction enzymes” when used in combination with other enzymes, (*e.g.*, S1 nucleases (Hyrup (1996) *supra*)); or as probes or primers for DNA sequencing or hybridization (Hyrup *et al.*, (1996) *supra*; Perry-O’Keefe *supra*).

[0134] In other embodiments, oligonucleotides may include other appended groups such as peptides (*e.g.*, for targeting host cell receptors *in vivo*), or agents facilitating transport across cell membranes (see *e.g.*, Letsinger *et al.*, Proc. Natl. Acad. Sci. USA 86: 6553-6556 (1989); Lemaitre *et al.*, Proc. Natl. Acad.

Sci. USA 84: 648-652 (1987); PCT Publication No. W088/09810) or the blood-brain barrier (see, *e.g.*, PCT Publication No. W0 89/10134). In addition, oligonucleotides can be modified with hybridization-triggered cleavage agents (See, *e.g.*, Krol *et al.*, Bio-Techniques 6: 958-976 (1988)) or intercalating agents. (See, *e.g.*, Zon, Pharm. Res. 5: 539-549 (1988)). To this end, the oligonucleotide may be conjugated to another molecule, (*e.g.*, a peptide, hybridization triggered cross-linking agent, transport agent, or hybridization-triggered cleavage agent).

[0135] Also included herein are molecular beacon oligonucleotide primer and probe molecules having one or more regions complementary to a *CETP*, *PROL4*, *GRID2*, *PDE4D* or *GPX3/TNIP1* nucleotide sequence or a substantially identical sequence thereof, two complementary regions one having a fluorophore and one a quencher such that the molecular beacon is useful for quantifying the presence of the nucleic acid in a sample. Molecular beacon nucleic acids are described, for example, in Lizardi *et al.*, U.S. Patent No. 5,854,033; Nazarenko *et al.*, U.S. Patent No. 5,866,336, and Livak *et al.*, U.S. Patent 5,876,930.

Antibody

[0136] The term “antibody” as used herein refers to an immunoglobulin molecule or immunologically active portion thereof, *i.e.*, an antigen-binding portion. Examples of immunologically active portions of immunoglobulin molecules include F(ab) and F(ab')₂ fragments which can be generated by treating the antibody with an enzyme such as pepsin. An antibody sometimes is a polyclonal, monoclonal, recombinant (*e.g.*, a chimeric or humanized), fully human, non-human (*e.g.*, murine), or a single chain antibody. An antibody may have effector function and can fix complement, and is sometimes coupled to a toxin or imaging agent.

Antibodies

[0137] A full-length polypeptide or antigenic peptide fragment encoded by a nucleotide sequence referenced herein can be used as an immunogen or can be used to identify antibodies made with other immunogens, *e.g.*, cells, membrane preparations, and the like. An antigenic peptide often includes at least 8 amino acid residues of the amino acid sequences encoded by a nucleotide sequence referenced herein, or substantially identical sequence thereof, and encompasses an epitope. Antigenic peptides sometimes include 10 or more amino acids, 15 or more amino acids, 20 or more amino acids, or 30 or more amino acids. Hydrophilic and hydrophobic fragments of polypeptides sometimes are used as immunogens.

[0138] Epitopes encompassed by the antigenic peptide are regions located on the surface of the polypeptide (*e.g.*, hydrophilic regions) as well as regions with high antigenicity. For example, an Ermini

surface probability analysis of the human polypeptide sequence can be used to indicate the regions that have a particularly high probability of being localized to the surface of the polypeptide and are thus likely to constitute surface residues useful for targeting antibody production. The antibody may bind an epitope on any domain or region on polypeptides described herein.

[0139] Also, chimeric, humanized, and completely human antibodies are useful for applications which include repeated administration to subjects. Chimeric and humanized monoclonal antibodies, comprising both human and non-human portions, can be made using standard recombinant DNA techniques. Such chimeric and humanized monoclonal antibodies can be produced by recombinant DNA techniques known in the art, for example using methods described in Robinson *et al* International Application No. PCT/US86/02269; Akira, *et al* European Patent Application 184,187; Taniguchi, M., European Patent Application 171,496; Morrison *et al* European Patent Application 173,494; Neuberger *et al* PCT International Publication No. WO 86/01533; Cabilly *et al* U.S. Patent No. 4,816,567; Cabilly *et al* European Patent Application 125,023; Better *et al.*, Science 240: 1041-1043 (1988); Liu *et al.*, Proc. Natl. Acad. Sci. USA 84: 3439-3443 (1987); Liu *et al.*, J. Immunol. 139: 3521-3526 (1987); Sun *et al.*, Proc. Natl. Acad. Sci. USA 84: 214-218 (1987); Nishimura *et al.*, Canc. Res. 47: 999-1005 (1987); Wood *et al.*, Nature 314: 446-449 (1985); and Shaw *et al.*, J. Natl. Cancer Inst. 80: 1553-1559 (1988); Morrison, S. L., Science 229: 1202-1207 (1985); Oi *et al.*, BioTechniques 4: 214 (1986); Winter U.S. Patent 5,225,539; Jones *et al.*, Nature 321: 552-525 (1986); Verhoeyan *et al.*, Science 239: 1534; and Beidler *et al.*, J. Immunol. 141: 4053-4060 (1988).

[0140] Completely human antibodies are particularly desirable for therapeutic treatment of human patients. Such antibodies can be produced using transgenic mice that are incapable of expressing endogenous immunoglobulin heavy and light chains genes, but which can express human heavy and light chain genes. See, for example, Lonberg and Huszar, Int. Rev. Immunol. 13: 65-93 (1995); and U.S. Patent Nos. 5,625,126; 5,633,425; 5,569,825; 5,661,016; and 5,545,806. In addition, companies such as Abgenix, Inc. (Fremont, CA) and Medarex, Inc. (Princeton, NJ), can be engaged to provide human antibodies directed against a selected antigen using technology similar to that described above. Completely human antibodies that recognize a selected epitope also can be generated using a technique referred to as "guided selection." In this approach a selected non-human monoclonal antibody (*e.g.*, a murine antibody) is used to guide the selection of a completely human antibody recognizing the same epitope. This technology is described for example by Jespers *et al.*, Bio/Technology 12: 899-903 (1994).

[0141] An antibody can be a single chain antibody. A single chain antibody (scFV) can be engineered (see, *e.g.*, Colcher *et al.*, Ann. N Y Acad. Sci. 880: 263-80 (1999); and Reiter, Clin. Cancer

Res. 2: 245-52 (1996)). Single chain antibodies can be dimerized or multimerized to generate multivalent antibodies having specificities for different epitopes of the same target polypeptide.

[0142] Antibodies also may be selected or modified so that they exhibit reduced or no ability to bind an Fc receptor. For example, an antibody may be an isotype or subtype, fragment or other mutant, which does not support binding to an Fc receptor (*e.g.*, it has a mutagenized or deleted Fc receptor binding region).

[0143] Also, an antibody (or fragment thereof) may be conjugated to a therapeutic moiety such as a cytotoxin, a therapeutic agent or a radioactive metal ion. A cytotoxin or cytotoxic agent includes any agent that is detrimental to cells. Examples include taxol, cytochalasin B, gramicidin D, ethidium bromide, emetine, mitomycin, etoposide, teniposide, vincristine, vinblastine, colchicin, doxorubicin, daunorubicin, dihydroxy anthracin dione, mitoxantrone, mithramycin, actinomycin D, 1 dehydrotestosterone, glucocorticoids, procaine, tetracaine, lidocaine, propranolol, and puromycin and analogs or homologs thereof. Therapeutic agents include, but are not limited to, antimetabolites (*e.g.*, methotrexate, 6-mercaptopurine, 6-thioguanine, cytarabine, 5-fluorouracil decarbazine), alkylating agents (*e.g.*, mechlorethamine, thiotepa chlorambucil, melphalan, carmustine (BCNU) and lomustine (CCNU), cyclophosphamide, busulfan, dibromomannitol, streptozotocin, mitomycin C, and cis-dichlorodiamine platinum (II) (DDP) cisplatin), anthracyclines (*e.g.*, daunorubicin (formerly daunomycin) and doxorubicin), antibiotics (*e.g.*, dactinomycin (formerly actinomycin), bleomycin, mithramycin, and anthramycin (AMC)), and anti-mitotic agents (*e.g.*, vincristine and vinblastine).

[0144] Antibody conjugates can be used for modifying a given biological response. For example, the drug moiety may be a protein or polypeptide possessing a desired biological activity. Such proteins may include, for example, a toxin such as abrin, ricin A, pseudomonas exotoxin, or diphtheria toxin; a polypeptide such as tumor necrosis factor, γ -interferon, α -interferon, nerve growth factor, platelet derived growth factor, tissue plasminogen activator; or, biological response modifiers such as, for example, lymphokines, interleukin-1 ("IL-1"), interleukin-2 ("IL-2"), interleukin-6 ("IL-6"), granulocyte macrophage colony stimulating factor ("GM-CSF"), granulocyte colony stimulating factor ("G-CSF"), or other growth factors. Also, an antibody can be conjugated to a second antibody to form an antibody heteroconjugate as described by Segal in U.S. Patent No. 4,676,980, for example.

[0145] An antibody (*e.g.*, monoclonal antibody) can be used to isolate target polypeptides by standard techniques, such as affinity chromatography or immunoprecipitation. Moreover, an antibody can be used to detect a target polypeptide (*e.g.*, in a cellular lysate or cell supernatant) in order to evaluate the abundance and pattern of expression of the polypeptide. Antibodies can be used diagnostically to monitor polypeptide levels in tissue as part of a clinical testing procedure, *e.g.*, to determine the efficacy

of a given treatment regimen. Detection can be facilitated by coupling (*i.e.*, physically linking) the antibody to a detectable substance (*i.e.*, antibody labeling). Examples of detectable substances include various enzymes, prosthetic groups, fluorescent materials, luminescent materials, bioluminescent materials, and radioactive materials. Examples of suitable enzymes include horseradish peroxidase, alkaline phosphatase, β -galactosidase, or acetylcholinesterase; examples of suitable prosthetic group complexes include streptavidin/biotin and avidin/biotin; examples of suitable fluorescent materials include umbelliferone, fluorescein, fluorescein isothiocyanate, rhodamine, dichlorotriazinylamine fluorescein, dansyl chloride or phycoerythrin; an example of a luminescent material includes luminol; examples of bioluminescent materials include luciferase, luciferin, and aequorin, and examples of suitable radioactive material include ^{125}I , ^{131}I , ^{35}S or ^3H . Also, an antibody can be utilized as a test molecule for determining whether it can treat osteoporosis, and as a therapeutic for administration to a subject for treating osteoporosis.

[0146] An antibody can be made by immunizing with a purified antigen, or a fragment thereof, *e.g.*, a fragment described herein, a membrane associated antigen, tissues, *e.g.*, crude tissue preparations, whole cells, preferably living cells, lysed cells, or cell fractions.

[0147] Included herein are antibodies which bind only a native polypeptide, only denatured or otherwise non-native polypeptide, or which bind both, as well as those having linear or conformational epitopes. Conformational epitopes sometimes can be identified by selecting antibodies that bind to native but not denatured polypeptide. Also featured are antibodies that specifically bind to a polypeptide variant associated with low BMD.

Methods for Identifying Candidate Therapeutics for Treating Osteoporosis

[0148] Current treatment for osteoporosis can help stop further bone loss and fractures, but there is still a clear need for specific anabolic agents that considerably increase bone formation in people who have already suffered substantial bone loss. There are no such drugs currently approved. Known osteoporosis treatments include bone-active phosphonates (See, *e.g.*, U.S. Patent No. 6,329,354), bisphosphonates, *e.g.*, alendronate (Fosamax®) and risedronate (Actonel®); calcitonin (Miacalcin®); estrogen and hormone therapy, *e.g.*, estrogens (Climara®, Estrace®, Estraderm®, Estratab®, Ogen®, Ortho-Est®, Vivelle®, Premarin®, and others) and estrogens and progestins (brand names, such as Activella™, FemHrt®, Premphase®, Prempro®, and others); parathyroid hormone, *e.g.*, teriparatide {PTH 1-34} (Forteo®); as well as, estrogen and estrogen receptor modulators (SERMs), *e.g.*, raloxifene HCl (Evista®), sodium fluoride and vitamin D metabolites. Any of the above therapeutics may be administered alone or in combination (*e.g.*, bone-active phosphonates and estrogen and hormone therapy).

Current therapeutic approaches were largely developed in the absence of defined molecular targets or even a solid understanding of disease pathogenesis. Therefore, provided are methods of identifying candidate therapeutics that target biochemical pathways related to the development of osteoporosis.

[0149] Thus, featured herein are methods for identifying a candidate therapeutic for treating osteoporosis. The methods comprise contacting a test molecule with a target molecule in a system. A “target molecule” as used herein refers to a *CETP*, *PROL4*, *GRID2*, *PDE4D* or *GPX3/TNIP1* nucleic acid, a substantially identical nucleic acid thereof, or a fragment thereof, and an encoded polypeptide of the foregoing. The methods also comprise determining the presence or absence of an interaction between the test molecule and the target molecule, where the presence of an interaction between the test molecule and the nucleic acid or polypeptide identifies the test molecule as a candidate osteoporosis therapeutic. The interaction between the test molecule and the target molecule may be quantified.

[0150] Test molecules and candidate therapeutics include, but are not limited to, compounds, antisense nucleic acids, siRNA molecules, ribozymes, polypeptides or proteins encoded by a *CETP*, *PROL4*, *GRID2*, *PDE4D* or *GPX3/TNIP1* nucleotide sequence, or a substantially identical sequence or fragment thereof, and immunotherapeutics (e.g., antibodies and HLA-presented polypeptide fragments). A test molecule or candidate therapeutic may act as a modulator of target molecule concentration or target molecule function in a system. A “modulator” may agonize (i.e., up-regulates) or antagonize (i.e., down-regulates) a target molecule concentration partially or completely in a system by affecting such cellular functions as DNA replication and/or DNA processing (e.g., DNA methylation or DNA repair), RNA transcription and/or RNA processing (e.g., removal of intronic sequences and/or translocation of spliced mRNA from the nucleus), polypeptide production (e.g., translation of the polypeptide from mRNA), and/or polypeptide post-translational modification (e.g., glycosylation, phosphorylation, and proteolysis of pro-polypeptides). A modulator may also agonize or antagonize a biological function of a target molecule partially or completely, where the function may include adopting a certain structural conformation, interacting with one or more binding partners, ligand binding, catalysis (e.g., phosphorylation, dephosphorylation, hydrolysis, methylation, and isomerization), and an effect upon a cellular event (e.g., effecting progression of osteoporosis). In certain embodiments, a candidate therapeutic increases BMD.

[0151] As used herein, the term “system” refers to a cell free in vitro environment and a cell-based environment such as a collection of cells, a tissue, an organ, or an organism. A system is “contacted” with a test molecule in a variety of manners, including adding molecules in solution and allowing them to interact with one another by diffusion, cell injection, and any administration routes in an animal. As used herein, the term “interaction” refers to an effect of a test molecule on test molecule, where the effect

sometimes is binding between the test molecule and the target molecule, and sometimes is an observable change in cells, tissue, or organism.

[0152] There are many standard methods for detecting the presence or absence of interaction between a test molecule and a target molecule. For example, titrametric, acidimetric, radiometric, NMR, monolayer, polarographic, spectrophotometric, fluorescent, and ESR assays probative of a target molecule interaction may be utilized.

[0153] Test molecule/target molecule interactions can be detected and/or quantified using assays known in the art. For example, an interaction can be determined by labeling the test molecule and/or the target molecule, where the label is covalently or non-covalently attached to the test molecule or target molecule. The label is sometimes a radioactive molecule such as ^{125}I , ^{131}I , ^{35}S or ^3H , which can be detected by direct counting of radioemission or by scintillation counting. Also, enzymatic labels such as horseradish peroxidase, alkaline phosphatase, or luciferase may be utilized where the enzymatic label can be detected by determining conversion of an appropriate substrate to product. In addition, presence or absence of an interaction can be determined without labeling. For example, a microphysiometer (*e.g.*, Cytosensor) is an analytical instrument that measures the rate at which a cell acidifies its environment using a light-addressable potentiometric sensor (LAPS). Changes in this acidification rate can be used as an indication of an interaction between a test molecule and target molecule (McConnell, H. M. *et al.*, *Science* 257: 1906-1912 (1992)).

[0154] In cell-based systems, cells typically include a *CETP*, *PROL4*, *GRID2*, *PDE4D* or *GPX3/TNIP1* nucleic acid, an encoded polypeptide, or substantially identical nucleic acid or polypeptide thereof, and are often of mammalian origin, although the cell can be of any origin. Whole cells, cell homogenates, and cell fractions (*e.g.*, cell membrane fractions) can be subjected to analysis. Where interactions between a test molecule with a target polypeptide are monitored, soluble and/or membrane bound forms of the polypeptide may be utilized. Where membrane-bound forms of the polypeptide are used, it may be desirable to utilize a solubilizing agent. Examples of such solubilizing agents include non-ionic detergents such as n-octylglucoside, n-dodecylglucoside, n-dodecylmaltoside, octanoyl-N-methylglucamide, decanoyl-N-methylglucamide, Triton[®] X-100, Triton[®] X-114, Thesit[®], Isotridecypoly(ethylene glycol ether)_n, 3-[(3-cholamidopropyl)dimethylamminio]-1-propane sulfonate (CHAPS), 3-[(3-cholamidopropyl)dimethylamminio]-2-hydroxy-1-propane sulfonate (CHAPSO), or N-dodecyl-N,N-dimethyl-3-ammonio-1-propane sulfonate.

[0155] An interaction between a test molecule and target molecule also can be detected by monitoring fluorescence energy transfer (FET) (*see, e.g.*, Lakowicz *et al.*, U.S. Patent No. 5,631,169; Stavrianopoulos *et al.* U.S. Patent No. 4,868,103). A fluorophore label on a first, "donor" molecule is

selected such that its emitted fluorescent energy will be absorbed by a fluorescent label on a second, “acceptor” molecule, which in turn is able to fluoresce due to the absorbed energy. Alternately, the “donor” polypeptide molecule may simply utilize the natural fluorescent energy of tryptophan residues. Labels are chosen that emit different wavelengths of light, such that the “acceptor” molecule label may be differentiated from that of the “donor”. Since the efficiency of energy transfer between the labels is related to the distance separating the molecules, the spatial relationship between the molecules can be assessed. In a situation in which binding occurs between the molecules, the fluorescent emission of the “acceptor” molecule label in the assay should be maximal. An FET binding event can be conveniently measured through standard fluorometric detection means well known in the art (*e.g.*, using a fluorimeter).

[0156] In another embodiment, determining the presence or absence of an interaction between a test molecule and a target molecule can be effected by monitoring surface plasmon resonance (*see, e.g.*, Sjolander & Urbanicz, *Anal. Chem.* 63: 2338-2345 (1991) and Szabo *et al.*, *Curr. Opin. Struct. Biol.* 5: 699-705 (1995)). “Surface plasmon resonance” or “biomolecular interaction analysis (BIA)” can be utilized to detect biospecific interactions in real time, without labeling any of the interactants (*e.g.*, BIAcore). Changes in the mass at the binding surface (indicative of a binding event) result in alterations of the refractive index of light near the surface (the optical phenomenon of surface plasmon resonance (SPR)), resulting in a detectable signal which can be used as an indication of real-time reactions between biological molecules.

[0157] In another embodiment, the target molecule or test molecules are anchored to a solid phase, facilitating the detection of target molecule/test molecule complexes and separation of the complexes from free, uncomplexed molecules. The target molecule or test molecule is immobilized to the solid support. In an embodiment, the target molecule is anchored to a solid surface, and the test molecule, which is not anchored, can be labeled, either directly or indirectly, with detectable labels discussed herein.

[0158] It may be desirable to immobilize a target molecule, an anti-target molecule antibody, and/or test molecules to facilitate separation of target molecule/test molecule complexes from uncomplexed forms, as well as to accommodate automation of the assay. The attachment between a test molecule and/or target molecule and the solid support may be covalent or non-covalent (*see, e.g.*, U.S. Patent No. 6,022,688 for non-covalent attachments). The solid support may be one or more surfaces of the system, such as one or more surfaces in each well of a microtiter plate, a surface of a silicon wafer, a surface of a bead (*see, e.g.*, Lam, *Nature* 354: 82-84 (1991)) that is optionally linked to another solid support, or a channel in a microfluidic device, for example. Types of solid supports, linker molecules for covalent and non-covalent attachments to solid supports, and methods for immobilizing nucleic acids and other

molecules to solid supports are well known (*see, e.g.*, U.S. Patent Nos. 6,261,776; 5,900,481; 6,133,436; and 6,022,688; and WIPO publication WO 01/18234).

[0159] In an embodiment, target molecule may be immobilized to surfaces via biotin and streptavidin. For example, biotinylated target polypeptide can be prepared from biotin-NHS (N-hydroxy-succinimide) using techniques known in the art (*e.g.*, biotinylation kit, Pierce Chemicals, Rockford, IL), and immobilized in the wells of streptavidin-coated 96 well plates (Pierce Chemical). In another embodiment, a target polypeptide can be prepared as a fusion polypeptide. For example, glutathione-S-transferase/target polypeptide fusion can be adsorbed onto glutathione sepharose beads (Sigma Chemical, St. Louis, MO) or glutathione derivitized microtiter plates, which are then combined with a test molecule under conditions conducive to complex formation (*e.g.*, at physiological conditions for salt and pH). Following incubation, the beads or microtiter plate wells are washed to remove any unbound components, or the matrix is immobilized in the case of beads, and complex formation is determined directly or indirectly as described above. Alternatively, the complexes can be dissociated from the matrix, and the level of target molecule binding or activity is determined using standard techniques.

[0160] In an embodiment, the non-immobilized component is added to the coated surface containing the anchored component. After the reaction is complete, unreacted components are removed (*e.g.*, by washing) under conditions such that a significant percentage of complexes formed will remain immobilized to the solid surface. The detection of complexes anchored on the solid surface can be accomplished in a number of manners. Where the previously non-immobilized component is pre-labeled, the detection of label immobilized on the surface indicates that complexes were formed. Where the previously non-immobilized component is not pre-labeled, an indirect label can be used to detect complexes anchored on the surface, *e.g.*, by adding a labeled antibody specific for the immobilized component, where the antibody, in turn, can be directly labeled or indirectly labeled with, *e.g.*, a labeled anti-Ig antibody.

[0161] In another embodiment, an assay is performed utilizing antibodies that specifically bind target molecule or test molecule but do not interfere with binding of the target molecule to the test molecule. Such antibodies can be derivitized to a solid support, and unbound target molecule may be immobilized by antibody conjugation. Methods for detecting such complexes, in addition to those described above for the GST-immobilized complexes, include immunodetection of complexes using antibodies reactive with the target molecule, as well as enzyme-linked assays which rely on detecting an enzymatic activity associated with the target molecule.

[0162] Cell free assays also can be conducted in a liquid phase. In such an assay, reaction products are separated from unreacted components, by any of a number of standard techniques, including but not

limited to: differential centrifugation (*see, e.g.,* Rivas, G., and Minton, *Trends Biochem Sci Aug; 18(8): 284-7 (1993)*); chromatography (gel filtration chromatography, ion-exchange chromatography); electrophoresis (*see, e.g.,* Ausubel *et al., eds. Current Protocols in Molecular Biology*, J. Wiley: New York (1999)); and immunoprecipitation (*see, e.g.,* Ausubel *et al., eds., supra*). Media and chromatographic techniques are known to one skilled in the art (*see, e.g.,* Heegaard, *J Mol. Recognit. Winter; 11(1-6): 141-8 (1998)*; Hage & Tweed, *J. Chromatogr. B Biomed. Sci. Appl. Oct 10; 699 (1-2): 499-525 (1997)*). Further, fluorescence energy transfer may also be conveniently utilized, as described herein, to detect binding without further purification of the complex from solution.

[0163] In another embodiment, modulators of target molecule expression are identified. For example, a cell or cell free mixture is contacted with a candidate compound and the expression of target mRNA or target polypeptide is evaluated relative to the level of expression of target mRNA or target polypeptide in the absence of the candidate compound. When expression of target mRNA or target polypeptide is greater in the presence of the candidate compound than in its absence, the candidate compound is identified as an agonist of target mRNA or target polypeptide expression. Alternatively, when expression of target mRNA or target polypeptide is less (*e.g.,* less with statistical significance) in the presence of the candidate compound than in its absence, the candidate compound is identified as an antagonist or inhibitor of target mRNA or target polypeptide expression. The level of target mRNA or target polypeptide expression can be determined by methods described herein.

[0164] In another embodiment, binding partners that interact with a target molecule are detected. The target molecules can interact with one or more cellular or extracellular macromolecules, such as polypeptides *in vivo*, and these interacting molecules are referred to herein as "binding partners." Binding partners can agonize or antagonize target molecule biological activity. Also, test molecules that agonize or antagonize interactions between target molecules and binding partners can be useful as therapeutic molecules as they can up-regulate or down-regulated target molecule activity *in vivo* and thereby treat osteoporosis.

[0165] Binding partners of target molecules can be identified by methods known in the art. For example, binding partners may be identified by lysing cells and analyzing cell lysates by electrophoretic techniques. Alternatively, a two-hybrid assay or three-hybrid assay can be utilized (*see, e.g.,* U.S. Patent No. 5,283,317; Zervos *et al., Cell* 72:223-232 (1993); Madura *et al., J. Biol. Chem.* 268: 12046-12054 (1993); Bartel *et al., Biotechniques* 14: 920-924 (1993); Iwabuchi *et al., Oncogene* 8: 1693-1696 (1993); and Brent WO94/10300). A two-hybrid system is based on the modular nature of most transcription factors, which consist of separable DNA-binding and activation domains. The assay often utilizes two different DNA constructs. In one construct, a *CETP*, *PROL4*, *GRID2*, *PDE4D* or *GPX3/TNIP1* nucleic

acid (sometimes referred to as the “bait”) is fused to a gene encoding the DNA binding domain of a known transcription factor (*e.g.*, GAL-4). In another construct, a DNA sequence from a library of DNA sequences that encodes a potential binding partner (sometimes referred to as the “prey”) is fused to a gene that encodes an activation domain of the known transcription factor. Sometimes, a *CETP*, *PROL4*, *GRID2*, *PDE4D* or *GPX3/TNIP1* nucleic acid can be fused to the activation domain. If the “bait” and the “prey” molecules interact *in vivo*, the DNA-binding and activation domains of the transcription factor are brought into close proximity. This proximity allows transcription of a reporter gene (*e.g.*, LacZ) which is operably linked to a transcriptional regulatory site responsive to the transcription factor. Expression of the reporter gene can be detected and cell colonies containing the functional transcription factor can be isolated and used to identify the potential binding partner.

[0166] In an embodiment for identifying test molecules that antagonize or agonize complex formation between target molecules and binding partners, a reaction mixture containing the target molecule and the binding partner is prepared, under conditions and for a time sufficient to allow complex formation. The reaction mixture often is provided in the presence or absence of the test molecule. The test molecule can be included initially in the reaction mixture, or can be added at a time subsequent to the addition of the target molecule and its binding partner. Control reaction mixtures are incubated without the test molecule or with a placebo. Formation of any complexes between the target molecule and the binding partner then is detected. Decreased formation of a complex in the reaction mixture containing test molecule as compared to in a control reaction mixture indicates that the molecule antagonizes target molecule/binding partner complex formation. Alternatively, increased formation of a complex in the reaction mixture containing test molecule as compared to in a control reaction mixture indicates that the molecule agonizes target molecule/binding partner complex formation. In another embodiment, complex formation of target molecule/binding partner can be compared to complex formation of mutant target molecule/binding partner (*e.g.*, amino acid modifications in a target polypeptide). Such a comparison can be important in those cases where it is desirable to identify test molecules that modulate interactions of mutant but not non-mutated target gene products.

[0167] The assays can be conducted in a heterogeneous or homogeneous format. In heterogeneous assays, target molecule and/or the binding partner are immobilized to a solid phase, and complexes are detected on the solid phase at the end of the reaction. In homogeneous assays, the entire reaction is carried out in a liquid phase. In either approach, the order of addition of reactants can be varied to obtain different information about the molecules being tested. For example, test compounds that agonize target molecule/binding partner interactions can be identified by conducting the reaction in the presence of the test molecule in a competition format. Alternatively, test molecules that agonize preformed complexes,

e.g., molecules with higher binding constants that displace one of the components from the complex, can be tested by adding the test compound to the reaction mixture after complexes have been formed.

[0168] In a heterogeneous assay embodiment, the target molecule or the binding partner is anchored onto a solid surface (*e.g.*, a microtiter plate), while the non-anchored species is labeled, either directly or indirectly. The anchored molecule can be immobilized by non-covalent or covalent attachments. Alternatively, an immobilized antibody specific for the molecule to be anchored can be used to anchor the molecule to the solid surface. The partner of the immobilized species is exposed to the coated surface with or without the test molecule. After the reaction is complete, unreacted components are removed (*e.g.*, by washing) such that a significant portion of any complexes formed will remain immobilized on the solid surface. Where the non-immobilized species is pre-labeled, the detection of label immobilized on the surface is indicative of complex. Where the non-immobilized species is not pre-labeled, an indirect label can be used to detect complexes anchored to the surface; *e.g.*, by using a labeled antibody specific for the initially non-immobilized species. Depending upon the order of addition of reaction components, test compounds that inhibit complex formation or that disrupt preformed complexes can be detected.

[0169] In another embodiment, the reaction can be conducted in a liquid phase in the presence or absence of test molecule, where the reaction products are separated from unreacted components, and the complexes are detected (*e.g.*, using an immobilized antibody specific for one of the binding components to anchor any complexes formed in solution, and a labeled antibody specific for the other partner to detect anchored complexes). Again, depending upon the order of addition of reactants to the liquid phase, test compounds that inhibit complex or that disrupt preformed complexes can be identified.

[0170] In an alternate embodiment, a homogeneous assay can be utilized. For example, a preformed complex of the target gene product and the interactive cellular or extracellular binding partner product is prepared. One or both of the target molecule or binding partner is labeled, and the signal generated by the label(s) is quenched upon complex formation (*e.g.*, U.S. Patent No. 4,109,496 that utilizes this approach for immunoassays). Addition of a test molecule that competes with and displaces one of the species from the preformed complex will result in the generation of a signal above background. In this way, test substances that disrupt target molecule/binding partner complexes can be identified.

[0171] Candidate therapeutics for treating osteoporosis are identified from a group of test molecules that interact with a target molecule. Test molecules are normally ranked according to the degree with which they modulate (*e.g.*, agonize or antagonize) a function associated with the target molecule (*e.g.*, DNA replication and/or processing, RNA transcription and/or processing, polypeptide production and/or processing, and/or biological function/activity), and then top ranking modulators are selected. Also,

pharmacogenomic information described herein can determine the rank of a modulator. The top 10% of ranked test molecules often are selected for further testing as candidate therapeutics, and sometimes the top 15%, 20%, or 25% of ranked test molecules are selected for further testing as candidate therapeutics. Candidate therapeutics typically are formulated for administration to a subject.

Therapeutic Formulations

[0172] Formulations and pharmaceutical compositions typically include in combination with a pharmaceutically acceptable carrier one or more target molecule modulators. The modulator often is a test molecule identified as having an interaction with a target molecule by a screening method described above. The modulator may be a compound, an antisense nucleic acid, a ribozyme, an antibody, or a binding partner. Also, formulations may comprise a target polypeptide or fragment thereof in combination with a pharmaceutically acceptable carrier.

[0173] As used herein, the term “pharmaceutically acceptable carrier” includes solvents, dispersion media, coatings, antibacterial and antifungal agents, isotonic and absorption delaying agents, and the like, compatible with pharmaceutical administration. Supplementary active compounds can also be incorporated into the compositions. Pharmaceutical compositions can be included in a container, pack, or dispenser together with instructions for administration.

[0174] A pharmaceutical composition typically is formulated to be compatible with its intended route of administration. Examples of routes of administration include parenteral, *e.g.*, intravenous, intradermal, subcutaneous, oral (*e.g.*, inhalation), transdermal (topical), transmucosal, and rectal administration. Solutions or suspensions used for parenteral, intradermal, or subcutaneous application can include the following components: a sterile diluent such as water for injection, saline solution, fixed oils, polyethylene glycols, glycerin, propylene glycol or other synthetic solvents; antibacterial agents such as benzyl alcohol or methyl parabens; antioxidants such as ascorbic acid or sodium bisulfite; chelating agents such as ethylenediaminetetraacetic acid; buffers such as acetates, citrates or phosphates and agents for the adjustment of tonicity such as sodium chloride or dextrose. pH can be adjusted with acids or bases, such as hydrochloric acid or sodium hydroxide. The parenteral preparation can be enclosed in ampoules, disposable syringes or multiple dose vials made of glass or plastic.

[0175] Oral compositions generally include an inert diluent or an edible carrier. For the purpose of oral therapeutic administration, the active compound can be incorporated with excipients and used in the form of tablets, troches, or capsules, *e.g.*, gelatin capsules. Oral compositions can also be prepared using a fluid carrier for use as a mouthwash. Pharmaceutically compatible binding agents, and/or adjuvant materials can be included as part of the composition. The tablets, pills, capsules, troches and the like can

contain any of the following ingredients, or compounds of a similar nature: a binder such as microcrystalline cellulose, gum tragacanth or gelatin; an excipient such as starch or lactose, a disintegrating agent such as alginic acid, Primogel, or corn starch; a lubricant such as magnesium stearate or Sterotes; a glidant such as colloidal silicon dioxide; a sweetening agent such as sucrose or saccharin; or a flavoring agent such as peppermint, methyl salicylate, or orange flavoring.

[0176] Pharmaceutical compositions suitable for injectable use include sterile aqueous solutions (where water soluble) or dispersions and sterile powders for the extemporaneous preparation of sterile injectable solutions or dispersion. For intravenous administration, suitable carriers include physiological saline, bacteriostatic water, Cremophor EL™ (BASF, Parsippany, NJ) or phosphate buffered saline (PBS). In all cases, the composition must be sterile and should be fluid to the extent that easy syringability exists. It should be stable under the conditions of manufacture and storage and must be preserved against the contaminating action of microorganisms such as bacteria and fungi. The carrier can be a solvent or dispersion medium containing, for example, water, ethanol, polyol (for example, glycerol, propylene glycol, and liquid polyethylene glycol, and the like), and suitable mixtures thereof. The proper fluidity can be maintained, for example, by the use of a coating such as lecithin, by the maintenance of the required particle size in the case of dispersion and by the use of surfactants. Prevention of the action of microorganisms can be achieved by various antibacterial and antifungal agents, for example, parabens, chlorobutanol, phenol, ascorbic acid, thimerosal, and the like. In many cases, it will be preferable to include isotonic agents, for example, sugars, polyalcohols such as mannitol, sorbitol, sodium chloride in the composition. Prolonged absorption of the injectable compositions can be brought about by including in the composition an agent which delays absorption, for example, aluminum monostearate and gelatin.

[0177] Sterile injectable solutions can be prepared by incorporating the active compound in the required amount in an appropriate solvent with one or a combination of ingredients enumerated above, as required, followed by filtered sterilization. Generally, dispersions are prepared by incorporating the active compound into a sterile vehicle which contains a basic dispersion medium and the required other ingredients from those enumerated above. In the case of sterile powders for the preparation of sterile injectable solutions, the preferred methods of preparation are vacuum drying and freeze-drying which yields a powder of the active ingredient plus any additional desired ingredient from a previously sterile-filtered solution thereof.

[0178] For administration by inhalation, the compounds are delivered in the form of an aerosol spray from pressured container or dispenser which contains a suitable propellant, *e.g.*, a gas such as carbon dioxide, or a nebulizer.

[0179] Systemic administration can also be by transmucosal or transdermal means. For transmucosal or transdermal administration, penetrants appropriate to the barrier to be permeated are used in the formulation. Such penetrants are generally known in the art, and include, for example, for transmucosal administration, detergents, bile salts, and fusidic acid derivatives. Transmucosal administration can be accomplished through the use of nasal sprays or suppositories. For transdermal administration, the active compounds are formulated into ointments, salves, gels, or creams as generally known in the art. Molecules can also be prepared in the form of suppositories (*e.g.*, with conventional suppository bases such as cocoa butter and other glycerides) or retention enemas for rectal delivery.

[0180] In one embodiment, active molecules are prepared with carriers that will protect the compound against rapid elimination from the body, such as a controlled release formulation, including implants and microencapsulated delivery systems. Biodegradable, biocompatible polymers can be used, such as ethylene vinyl acetate, polyanhydrides, polyglycolic acid, collagen, polyorthoesters, and polylactic acid. Methods for preparation of such formulations will be apparent to those skilled in the art. Materials can also be obtained commercially from Alza Corporation and Nova Pharmaceuticals, Inc. Liposomal suspensions (including liposomes targeted to infected cells with monoclonal antibodies to viral antigens) can also be used as pharmaceutically acceptable carriers. These can be prepared according to methods known to those skilled in the art, for example, as described in U.S. Patent No. 4,522,811.

[0181] It is advantageous to formulate oral or parenteral compositions in dosage unit form for ease of administration and uniformity of dosage. Dosage unit form as used herein refers to physically discrete units suited as unitary dosages for the subject to be treated; each unit containing a predetermined quantity of active compound calculated to produce the desired therapeutic effect in association with the required pharmaceutical carrier.

[0182] Toxicity and therapeutic efficacy of such compounds can be determined by standard pharmaceutical procedures in cell cultures or experimental animals, *e.g.*, for determining the LD₅₀ (the dose lethal to 50% of the population) and the ED₅₀ (the dose therapeutically effective in 50% of the population). The dose ratio between toxic and therapeutic effects is the therapeutic index and it can be expressed as the ratio LD₅₀/ED₅₀. Molecules which exhibit high therapeutic indices are preferred. While molecules that exhibit toxic side effects may be used, care should be taken to design a delivery system that targets such compounds to the site of affected tissue in order to minimize potential damage to uninfected cells and, thereby, reduce side effects.

[0183] The data obtained from the cell culture assays and animal studies can be used in formulating a range of dosage for use in humans. The dosage of such molecules lies preferably within a range of circulating concentrations that include the ED₅₀ with little or no toxicity. The dosage may vary within

this range depending upon the dosage form employed and the route of administration utilized. For any molecules used in the methods described herein, the therapeutically effective dose can be estimated initially from cell culture assays. A dose may be formulated in animal models to achieve a circulating plasma concentration range that includes the IC_{50} (*i.e.*, the concentration of the test compound which achieves a half-maximal inhibition of symptoms) as determined in cell culture. Such information can be used to more accurately determine useful doses in humans. Levels in plasma may be measured, for example, by high performance liquid chromatography.

[0184] As defined herein, a therapeutically effective amount of protein or polypeptide (*i.e.*, an effective dosage) ranges from about 0.001 to 30 mg/kg body weight, sometimes about 0.01 to 25 mg/kg body weight, often about 0.1 to 20 mg/kg body weight, and more often about 1 to 10 mg/kg, 2 to 9 mg/kg, 3 to 8 mg/kg, 4 to 7 mg/kg, or 5 to 6 mg/kg body weight. The protein or polypeptide can be administered one time per week for between about 1 to 10 weeks, sometimes between 2 to 8 weeks, often between about 3 to 7 weeks, and more often for about 4, 5, or 6 weeks. The skilled artisan will appreciate that certain factors may influence the dosage and timing required to effectively treat a subject, including but not limited to the severity of the disease or disorder, previous treatments, the general health and/or age of the subject, and other diseases present. Moreover, treatment of a subject with a therapeutically effective amount of a protein, polypeptide, or antibody can include a single treatment or, preferably, can include a series of treatments.

[0185] With regard to polypeptide formulations, featured herein is a method for treating osteoporosis in a subject, which comprises contacting one or more cells in the subject with a first polypeptide, where the subject comprises a second polypeptide having one or more polymorphic variations associated with low BMD, and where the first polypeptide comprises fewer polymorphic variations associated with low BMD than the second polypeptide. The first and second polypeptides are encoded by a nucleic acid which comprises a nucleotide sequence in SEQ ID NO's:1-10; a nucleotide sequence which encodes a polypeptide consisting of an amino acid sequence encoded by a nucleotide sequence referenced in SEQ ID NO's:1-10; a nucleotide sequence which encodes a polypeptide that is 90% or more identical to an amino acid sequence encoded by a nucleotide sequence of SEQ ID NO's:1-10 and a nucleotide sequence 90% or more identical to a nucleotide sequence in SEQ ID NO's:1-10. The subject often is a human.

[0186] For antibodies, a dosage of 0.1 mg/kg of body weight (generally 10 mg/kg to 20 mg/kg) is often utilized. If the antibody is to act in the brain, a dosage of 50 mg/kg to 100 mg/kg is often appropriate. Generally, partially human antibodies and fully human antibodies have a longer half-life within the human body than other antibodies. Accordingly, lower dosages and less frequent administration is often possible. Modifications such as lipidation can be used to stabilize antibodies and

to enhance uptake and tissue penetration (*e.g.*, into the brain). A method for lipidation of antibodies is described by Cruikshank *et al.*, *J. Acquired Immune Deficiency Syndromes and Human Retrovirology* 14:193 (1997).

[0187] Antibody conjugates can be used for modifying a given biological response, the drug moiety is not to be construed as limited to classical chemical therapeutic agents. For example, the drug moiety may be a protein or polypeptide possessing a desired biological activity. Such proteins may include, for example, a toxin such as abrin, ricin A, pseudomonas exotoxin, or diphtheria toxin; a polypeptide such as tumor necrosis factor, .alpha.-interferon, .beta.-interferon, nerve growth factor, platelet derived growth factor, tissue plasminogen activator; or, biological response modifiers such as, for example, lymphokines, interleukin-1 ("IL-1"), interleukin-2 ("IL-2"), interleukin-6 ("IL-6"), granulocyte macrophage colony stimulating factor ("GM-CSF"), granulocyte colony stimulating factor ("G-CSF"), or other growth factors. Alternatively, an antibody can be conjugated to a second antibody to form an antibody heteroconjugate as described by Segal in U.S. Patent No. 4,676,980.

[0188] For compounds, exemplary doses include milligram or microgram amounts of the compound per kilogram of subject or sample weight, for example, about 1 microgram per kilogram to about 500 milligrams per kilogram, about 100 micrograms per kilogram to about 5 milligrams per kilogram, or about 1 microgram per kilogram to about 50 micrograms per kilogram. It is understood that appropriate doses of a small molecule depend upon the potency of the small molecule with respect to the expression or activity to be modulated. When one or more of these small molecules is to be administered to an animal (*e.g.*, a human) in order to modulate expression or activity of a polypeptide or nucleic acid described herein, a physician, veterinarian, or researcher may, for example, prescribe a relatively low dose at first, subsequently increasing the dose until an appropriate response is obtained. In addition, it is understood that the specific dose level for any particular animal subject will depend upon a variety of factors including the activity of the specific compound employed, the age, body weight, general health, gender, and diet of the subject, the time of administration, the route of administration, the rate of excretion, any drug combination, and the degree of expression or activity to be modulated.

[0189] With regard to nucleic acid formulations, gene therapy vectors can be delivered to a subject by, for example, intravenous injection, local administration (*see, e.g.*, U.S. Patent 5,328,470) or by stereotactic injection (*see e.g.*, Chen *et al.*, (1994) *Proc. Natl. Acad. Sci. USA* 91:3054-3057). Pharmaceutical preparations of gene therapy vectors can include a gene therapy vector in an acceptable diluent, or can comprise a slow release matrix in which the gene delivery vehicle is imbedded. Alternatively, where the complete gene delivery vector can be produced intact from recombinant cells

(e.g., retroviral vectors) the pharmaceutical preparation can include one or more cells which produce the gene delivery system. Examples of gene delivery vectors are described herein.

Therapeutic Methods

[0190] A therapeutic formulation described above can be administered to a subject in need of a therapeutic for inducing a desired biological response.. Therapeutic formulations can be administered by any of the paths described herein. With regard to both prophylactic and therapeutic methods of treatment, such treatments may be specifically tailored or modified, based on knowledge obtained from pharmacogenomic analyses described herein.

[0191] As used herein, the term “treatment” is defined as the application or administration of a therapeutic formulation to a subject, or application or administration of a therapeutic agent to an isolated tissue or cell line from a subject with the purpose to cure, heal, alleviate, relieve, alter, remedy, ameliorate, improve or affect osteoporosis, symptoms of osteoporosis or a predisposition towards osteoporosis. A therapeutic formulation includes, but is not limited to, small molecules, peptides, antibodies, ribozymes and antisense oligonucleotides. Administration of a therapeutic formulation can occur prior to the manifestation of symptoms characteristic of low BMD, such that osteoporosis is prevented or delayed in its progression. The appropriate therapeutic composition can be determined based on screening assays described herein.

[0192] As discussed, successful treatment of osteoporosis can be brought about by techniques that serve to agonize target molecule expression or function, or alternatively, antagonize target molecule expression or function. These techniques include administration of modulators that include, but are not limited to, small organic or inorganic molecules; antibodies (including, for example, polyclonal, monoclonal, humanized, anti-idiotypic, chimeric or single chain antibodies, and Fab, F(ab')₂ and Fab expression library fragments, scFV molecules, and epitope-binding fragments thereof); and peptides, phosphopeptides, or polypeptides.

[0193] Further, antisense and ribozyme molecules that inhibit expression of the target gene can also be used to reduce the level of target gene expression, thus effectively reducing the level of target gene activity. Still further, triple helix molecules can be utilized in reducing the level of target gene activity. Antisense, ribozyme and triple helix molecules are discussed above. It is possible that the use of antisense, ribozyme, and/or triple helix molecules to reduce or inhibit mutant gene expression can also reduce or inhibit the transcription (triple helix) and/or translation (antisense, ribozyme) of mRNA produced by normal target gene alleles, such that the concentration of normal target gene product present can be lower than is necessary for a normal phenotype. In such cases, nucleic acid molecules that encode

and express target gene polypeptides exhibiting normal target gene activity can be introduced into cells via gene therapy method. Alternatively, in instances in that the target gene encodes an extracellular polypeptide, it can be preferable to co-administer normal target gene polypeptide into the cell or tissue in order to maintain the requisite level of cellular or tissue target gene activity.

[0194] Another method by which nucleic acid molecules may be utilized in treating or preventing osteoporosis is use of aptamer molecules specific for target molecules. Aptamers are nucleic acid molecules having a tertiary structure which permits them to specifically bind to ligands (*see, e.g., Osborne, et al., Curr. Opin. Chem. Biol.* 1(1): 5-9 (1997); and Patel, D. J., *Curr. Opin. Chem. Biol. Jun; 1(1): 32-46 (1997)*).

[0195] Yet another method of utilizing nucleic acid molecules for osteoporosis treatment is gene therapy, which can also be referred to as allele therapy. Provided herein is a gene therapy method for treating osteoporosis in a subject, which comprises contacting one or more cells in the subject or from the subject with a nucleic acid having a first nucleotide sequence. Genomic DNA in the subject comprises a second nucleotide sequence having one or more polymorphic variations associated with low BMD (*e.g., the second nucleic acid has a nucleotide sequence in SEQ ID NO's:1-10*). The first and second nucleotide sequences typically are substantially identical to one another, and the first nucleotide sequence comprises fewer polymorphic variations associated with low BMD than the second nucleotide sequence. The first nucleotide sequence may comprise a gene sequence that encodes a full-length polypeptide or a fragment thereof. The subject is often a human. Allele therapy methods often are utilized in conjunction with a method of first determining whether a subject has genomic DNA that includes polymorphic variants associated with low BMD.

[0196] In another allele therapy embodiment, provided herein is a method which comprises contacting one or more cells in the subject or from the subject with a polypeptide encoded by a nucleic acid having a first nucleotide sequence. Genomic DNA in the subject comprises a second nucleotide sequence having one or more polymorphic variations associated with low BMD (*e.g., the second nucleic acid has a nucleotide sequence in SEQ ID NO's:1-10*). The first and second nucleotide sequences typically are substantially identical to one another, and the first nucleotide sequence comprises fewer polymorphic variations associated with low BMD than the second nucleotide sequence. The first nucleotide sequence may comprise a gene sequence that encodes a full-length polypeptide or a fragment thereof. The subject is often a human.

[0197] For antibody-based therapies, antibodies can be generated that are both specific for target molecules and that reduce target molecule activity. Such antibodies may be administered in instances where antagonizing a target molecule function is appropriate for the treatment of osteoporosis.

[0198] In circumstances where stimulating antibody production in an animal or a human subject by injection with a target molecule is harmful to the subject, it is possible to generate an immune response against the target molecule by use of anti-idiotypic antibodies (*see, e.g., Herlyn, Ann. Med.; 31(1): 66-78 (1999); and Bhattacharya-Chatterjee & Foon, Cancer Treat. Res.; 94: 51-68 (1998)*). Introducing an anti-idiotypic antibody to a mammal or human subject often stimulates production of anti-anti-idiotypic antibodies, which typically are specific to the target molecule. Vaccines directed to osteoporosis also may be generated in this fashion.

[0199] In instances where the target molecule is intracellular and whole antibodies are used, internalizing antibodies may be preferred. Lipofectin or liposomes can be used to deliver the antibody or a fragment of the Fab region that binds to the target antigen into cells. Where fragments of the antibody are used, the smallest inhibitory fragment that binds to the target antigen is preferred. For example, peptides having an amino acid sequence corresponding to the Fv region of the antibody can be used. Alternatively, single chain neutralizing antibodies that bind to intracellular target antigens can also be administered. Such single chain antibodies can be administered, for example, by expressing nucleotide sequences encoding single-chain antibodies within the target cell population (*see, e.g., Marasco et al., Proc. Natl. Acad. Sci. USA 90: 7889-7893 (1993)*).

[0200] Modulators can be administered to a patient at therapeutically effective doses to treat osteoporosis. A therapeutically effective dose refers to an amount of the modulator sufficient to result in amelioration of symptoms of osteoporosis. Toxicity and therapeutic efficacy of modulators can be determined by standard pharmaceutical procedures in cell cultures or experimental animals, *e.g.,* for determining the LD₅₀ (the dose lethal to 50% of the population) and the ED₅₀ (the dose therapeutically effective in 50% of the population). The dose ratio between toxic and therapeutic effects is the therapeutic index and it can be expressed as the ratio LD₅₀/ED₅₀. Modulators that exhibit large therapeutic indices are preferred. While modulators that exhibit toxic side effects can be used, care should be taken to design a delivery system that targets such molecules to the site of affected tissue in order to minimize potential damage to uninfected cells, thereby reducing side effects.

[0201] Data obtained from cell culture assays and animal studies can be used in formulating a range of dosages for use in humans. The dosage of such compounds lies preferably within a range of circulating concentrations that include the ED₅₀ with little or no toxicity. The dosage can vary within this range depending upon the dosage form employed and the route of administration utilized. For any compound used in the methods described herein, the therapeutically effective dose can be estimated initially from cell culture assays. A dose can be formulated in animal models to achieve a circulating plasma concentration range that includes the IC₅₀ (*i.e.,* the concentration of the test compound that

achieves a half-maximal inhibition of symptoms) as determined in cell culture. Such information can be used to more accurately determine useful doses in humans. Levels in plasma can be measured, for example, by high performance liquid chromatography.

[0202] Another example of effective dose determination for an individual is the ability to directly assay levels of “free” and “bound” compound in the serum of the test subject. Such assays may utilize antibody mimics and/or “biosensors” that have been created through molecular imprinting techniques. Molecules that modulate target molecule activity are used as a template, or “imprinting molecule”, to spatially organize polymerizable monomers prior to their polymerization with catalytic reagents. The subsequent removal of the imprinted molecule leaves a polymer matrix which contains a repeated “negative image” of the compound and is able to selectively rebind the molecule under biological assay conditions. A detailed review of this technique can be seen in Ansell *et al.*, *Current Opinion in Biotechnology* 7: 89-94 (1996) and in Shea, *Trends in Polymer Science* 2: 166-173 (1994). Such “imprinted” affinity matrixes are amenable to ligand-binding assays, whereby the immobilized monoclonal antibody component is replaced by an appropriately imprinted matrix. An example of the use of such matrixes in this way can be seen in Vlatakis, *et al.*, *Nature* 361: 645-647 (1993). Through the use of isotope-labeling, the “free” concentration of compound which modulates target molecule expression or activity readily can be monitored and used in calculations of IC_{50} . Such “imprinted” affinity matrixes can also be designed to include fluorescent groups whose photon-emitting properties measurably change upon local and selective binding of target compound. These changes readily can be assayed in real time using appropriate fiberoptic devices, in turn allowing the dose in a test subject to be quickly optimized based on its individual IC_{50} . An example of such a “biosensor” is discussed in Kriz *et al.*, *Analytical Chemistry* 67: 2142-2144 (1995).

[0203] The examples set forth below are intended to illustrate but not limit the invention.

Examples

[0204] In the following studies a group of subjects were selected according to specific parameters relating to low BMD. Nucleic acid samples obtained from individuals in the study group were subjected to genetic analysis, which identified associations between low BMD and certain polymorphic variants in *CETP*, *PROL4*, *GRID2*, *PDE4D* and *GPX3* (herein referred to as “target genes”, “target nucleotides”, “target polypeptides” or simply “targets”). Methods are described for producing *CETP*, *PROL4*, *GRID2*, *PDE4D* and *GPX3* polypeptides and polypeptide variants *in vitro* or *in vivo*. *CETP*, *PROL4*, *GRID2*, *PDE4D* and *GPX3* nucleic acids or polypeptides and variants thereof are utilized for screening test molecules for those that interact with *CETP*, *PROL4*, *GRID2*, *PDE4D* and *GPX3* molecules. Test

molecules identified as being interactors with target polypeptides can be screened further as osteoporosis therapeutics.

Example 1

Samples and Pooling Strategies

Sample Selection

[0205] Blood samples were collected from individuals with low BMD, which were referred to as case samples. Also, blood samples were collected from individuals with high BMD (*i.e.*, not diagnosed with osteoporosis or any form of osteoporosis-related disease); these samples served as gender and age-matched controls. All of the samples were of Caucasian (English) descent. A database was created that listed all phenotypic trait information gathered from individuals for each case and control sample. Genomic DNA was extracted from each of the blood samples for genetic analyses.

DNA Extraction from Blood Samples

[0206] Six to ten milliliters of whole blood was transferred to a 50 ml tube containing 27 ml of red cell lysis solution (RCL). The tube was inverted until the contents were mixed. Each tube was incubated for 10 minutes at room temperature and inverted once during the incubation. The tubes were then centrifuged for 20 minutes at 3000 x g and the supernatant was carefully poured off. 100-200 µl of residual liquid was left in the tube and was pipetted repeatedly to resuspend the pellet in the residual supernatant. White cell lysis solution (WCL) was added to the tube and pipetted repeatedly until completely mixed. While no incubation was normally required, the solution was incubated at 37°C or room temperature if cell clumps were visible after mixing until the solution was homogeneous. 2 ml of protein precipitation was added to the cell lysate. The mixtures were vortexed vigorously at high speed for 20 sec to mix the protein precipitation solution uniformly with the cell lysate, and then centrifuged for 10 minutes at 3000 x g. The supernatant containing the DNA was then poured into a clean 15 ml tube, which contained 7 ml of 100% isopropanol. The samples were mixed by inverting the tubes gently until white threads of DNA were visible. Samples were centrifuged for 3 minutes at 2000 x g and the DNA was visible as a small white pellet. The supernatant was decanted and 5 ml of 70% ethanol was added to each tube. Each tube was inverted several times to wash the DNA pellet, and then centrifuged for 1 minute at 2000 x g. The ethanol was decanted and each tube was drained on clean absorbent paper. The DNA was dried in the tube by inversion for 10 minutes, and then 1000 µl of 1X TE was added. The size of each sample was estimated, and less TE buffer was added during the following DNA hydration step if

the sample was smaller. The DNA was allowed to rehydrate overnight at room temperature, and DNA samples were stored at 2-8°C.

[0207] DNA was quantified by placing samples on a hematology mixer for at least 1 hour. DNA was serially diluted (typically 1:80, 1:160, 1:320, and 1:640 dilutions) so that it would be within the measurable range of standards. 125 µl of diluted DNA was transferred to a clear U-bottom microtitre plate, and 125 µl of 1X TE buffer was transferred into each well using a multichannel pipette. The DNA and 1X TE were mixed by repeated pipetting at least 15 times, and then the plates were sealed. 50 µl of diluted DNA was added to wells A5-H12 of a black flat bottom microtitre plate. Standards were inverted six times to mix them, and then 50 µl of 1X TE buffer was pipetted into well A1, 1000 ng/ml of standard was pipetted into well A2, 500 ng/ml of standard was pipetted into well A3, and 250 ng/ml of standard was pipetted into well A4. PicoGreen (Molecular Probes, Eugene, Oregon) was thawed and freshly diluted 1:200 according to the number of plates that were being measured. PicoGreen was vortexed and then 50µl was pipetted into all wells of the black plate with the diluted DNA. DNA and PicoGreen were mixed by pipetting repeatedly at least 10 times with the multichannel pipette. The plate was placed into a Fluoroskan Ascent Machine (microplate fluorometer produced by Labsystems) and the samples were allowed to incubate for 3 minutes before the machine was run using filter pairs 485 nm excitation and 538 nm emission wavelengths. Samples having measured DNA concentrations of greater than 450 ng/µl were re-measured for conformation. Samples having measured DNA concentrations of 20 ng/µl or less were re-measured for confirmation.

Pooling Strategies

[0208] Samples were placed into one of two groups based on BMD levels. The two groups were made up of individuals with low BMD levels and individuals with high BMD levels. A select set of samples from each group were utilized to generate pools, and one pool was created for each group. Each individual sample in a pool was represented by an equal amount of genomic DNA. For example, where 25 ng of genomic DNA was utilized in each PCR reaction and there were 200 individuals in each pool, each individual would provide 125 pg of genomic DNA. Inclusion or exclusion of samples for a pool was based upon the following criteria: the sample was derived from an individual of Caucasian paternal and maternal descent; the database included relevant phenotype information for the individual; case samples were derived from individuals with low BMD; control samples were derived from individuals with normal or high BMD and no history of osteoporosis or osteoporosis-related diseases; and sufficient genomic DNA was extracted from each blood sample for all allelotyping and genotyping reactions performed during the study. Phenotype information included pre- or post-menopausal, familial

predisposition, country or origin of mother and father, diagnosis with osteoporosis (date of primary diagnosis, age of individual as of primary diagnosis, osteoporosis-related fracture), biochemical measurements of markers of bone resorption (bone-specific alkaline Phosphatase, Urinary C-telopeptide of type I collagen, serum osteocalcin), current medication status (thyroid medication, hormone replacement therapy, steroid usage, bisphosphonates and cytotoxic agents for rheumatic diseases). Samples that met the inclusion criteria and did not meet the exclusion criteria were added to appropriate pools based on gender and disease status.

The selection process yielded the pools set forth in Table 2, which were used in the studies that follow. The average (mean) T-score in the High group is 1.56, and in the Low group -2.1 which means that on average individuals in the high BMD pool are 1.56 standard deviations above the average BMD in young females, whereas individuals in the low BMD pool are on average 2.1 standard deviations below the normal young value.

TABLE 2

	Female High BMD	Female Low BMD
Pool size (Number)	321	319
Mean T-score (BMD leveles adjusted for age and BMI)	1.56	-2.10
Mean Age (ex: years)	52.9	52.4

Example 2

Association of Polymorphic Variants with Low BMD

[0209] A whole-genome screen was performed to identify particular SNPs associated with low BMD. As described in Example 1, two groups of samples were utilized, which included samples from female individuals having low BMD (osteoporosis cases), and samples from female individuals having high BMD levels (controls). The initial screen of each pool was performed in an allelotyping study, in which certain samples in each group were pooled. By pooling DNA from each group, an allele frequency for each SNP in each group was calculated. These allele frequencies were then compared to one another. Particular SNPs were considered as being associated with low BMD when allele frequency differences calculated between case and control pools were statistically significant. SNP disease association results obtained from the allelotyping study were then validated by genotyping each associated SNP across all samples from each pool. The results of the genotyping were then analyzed, allele frequencies for each group were calculated from the individual genotyping results, and a p-value was calculated to determine

whether the case and control groups had statistically significant differences in allele frequencies for a particular SNP. When the genotyping results agreed with the original allelotyping results, the SNP disease association was considered validated at the genetic level.

SNP Panel Used for Genetic Analyses

[0210] A whole-genome SNP screen began with an initial screen of approximately 25,000 SNPs over each set of disease and control samples using a pooling approach. The pools studied in the screen are described in Example 1. The SNPs analyzed in this study were part of a set of 25,488 SNPs confirmed as being statistically polymorphic as each is characterized as having a minor allele frequency of greater than 10%. The SNPs in the set reside in genes or in close proximity to genes, and many reside in gene exons. Specifically, SNPs in the set are located in exons, introns, and within 5,000 base-pairs upstream of a transcription start site of a gene. In addition, SNPs were selected according to the following criteria: they are located in ESTs; they are located in Locuslink or Ensembl genes; and they are located in Genomatix promoter predictions. SNPs in the set were also selected on the basis of even spacing across the genome, as depicted in Table 3. An additional 3088 SNPs were included with these 25,488 SNPs and these additional SNPs had been chosen on the basis of gene location, with preference to non-synonymous coding SNPs located in disease candidate genes.

TABLE 3

General Statistics		Spacing Statistics	
Total # of SNPs	25,488	Median	37,058 bp
# of Exonic SNPs	>4,335 (17%)	Minimum*	1,000 bp
# SNPs with refSNP ID	20,776 (81%)	Maximum*	3,000,000 bp
Gene Coverage	>10,000	Mean	122,412 bp
Chromosome Coverage	All	Std Deviation	373,325 bp
		<i>*Excludes outliers</i>	

Allelotyping and Genotyping Results

[0211] The genetic studies summarized above and described in more detail below identified allelic variants associated with low BMD. The allelic variants identified from the SNP panel described in Table 3 are summarized below in Table 4.

TABLE 4

SNP Reference	Chromosome	Chromosome Position	Position in SEQ ID Nos	Contig Identification	Contig Position	Sequence Identification	Locus	Sequence Position	Allelic Variability	Low BMD Assoc. Allele
rs1801706	16q21	57068823	50109	NT_010498	10831861	NM_000078	CETP	UTR	AG	G
rs1047699	12p13	11143886	49075	NT_009714	3758682	NM_007244	PROL4	Exon: R120Q	CT	C
rs1948017	4q22	94636365	49110	NT_016354	18829520	NM_001510	GRID2	Intron	CT	C
rs1498608	5q12	59895580	49652	NT_006713	8937426	NM_006203	PDE4D	Intron	AT	T
rs869975	5q23	150475233	50082	NT_029289	11569308	NM_002084	GPX3	Intron	AG	G

[0212] Table 4 includes information pertaining to the incident polymorphic variant associated with low BMD identified herein. Public information pertaining to the polymorphism and the genomic sequence that includes the polymorphism are indicated. The genomic sequences identified in Table 4 may be accessed at the http address www.ncbi.nih.gov/entrez/query.fcgi, for example, by using the publicly available SNP reference number (e.g., rs1801706). The chromosome position refers to the position of the SNP within NCBI's Genome Build 34, which may be accessed at the following http address: www.ncbi.nlm.nih.gov/mapview/map_search.cgi?chr=hum_chr.inf&query=. The "Contig Position" provided in Table 4 corresponds to a nucleotide position set forth in the contig sequence, and designates the polymorphic site corresponding to the SNP reference number. The sequence containing the polymorphisms also may be referenced by the "Sequence Identification" set forth in Table 4. The "Sequence Identification" corresponds to cDNA sequence that encodes associated target polypeptides (e.g., CETP) of the invention. The position of the SNP within the cDNA sequence is provided in the "Sequence Position" column of Table 4. Also, the allelic variation at the polymorphic site and the allelic variant identified as associated with low BMD is specified in Table 4. All nucleotide sequences referenced and accessed by the parameters set forth in Table 4 are incorporated herein by reference.

Assay for Verifying, Allelotyping, and Genotyping SNPs

[0213] A MassARRAY® system (Sequenom, Inc.) was utilized to perform SNP genotyping in a high-throughput fashion. This genotyping platform was complemented by a homogeneous, single-tube assay method (hME™ or homogeneous MassEXTEND™ (Sequenom, Inc.)) in which two genotyping primers anneal to and amplify a genomic target surrounding a polymorphic site of interest. A third primer (the MassEXTEND™ primer), which is complementary to the amplified target up to but not including the polymorphism, was then enzymatically extended one or a few bases through the polymorphic site and then terminated.

[0214] For each polymorphism, SpectroDESIGNER™ software (Sequenom, Inc.) was used to generate a set of PCR primers and a MassEXTEND™ primer was used to genotype the polymorphism. Table 5 shows PCR primers and Table 6 shows extension primers used for analyzing polymorphisms. The initial PCR amplification reaction was performed in a 5 µl total volume containing 1X PCR buffer with 1.5 mM MgCl₂ (Qiagen), 200 µM each of dATP, dGTP, dCTP, dTTP (Gibco-BRL), 2.5 ng of genomic DNA, 0.1 units of HotStar DNA polymerase (Qiagen), and 200 nM each of forward and reverse PCR primers specific for the polymorphic region of interest.

TABLE 5: PCR Primers

Reference SNP ID	Forward PCR primer	Reverse PCR primer
rs1801706	ACGTTGGATGTTGTAGCAGAAGGCAAGCAC	ACGTTGGATGTCCATCTCCGTA CTCTCCTAAC
rs1047699	GATTACCAGAGTGGTTGCTC	CCTGCAGGAAGCATCATCAT
rs1948017	GTTTAACAGCAACCATTGAGG	CCCCAAAGGTATGTTAAGAG
rs1498608	GAATCCCTGTTCAATTCCTTG	ATACCTAGGTATAACCTCGG
rs869975	AACTCACTGGTGATCCTGCG	TGTCTCATCCACACCACTCC

[0215] Samples were incubated at 95°C for 15 minutes, followed by 45 cycles of 95°C for 20 seconds, 56°C for 30 seconds, and 72°C for 1 minute, finishing with a 3 minute final extension at 72°C. Following amplification, shrimp alkaline phosphatase (SAP) (0.3 units in a 2 µl volume) (Amersham Pharmacia) was added to each reaction (total reaction volume was 7 µl) to remove any residual dNTPs that were not consumed in the PCR step. Samples were incubated for 20 minutes at 37°C, followed by 5 minutes at 85°C to denature the SAP.

[0216] Once the SAP reaction was complete, a primer extension reaction was initiated by adding a polymorphism-specific MassEXTEND™ primer cocktail to each sample. Each MassEXTEND™ cocktail included a specific combination of dideoxynucleotides (ddNTPs) and deoxynucleotides (dNTPs) used to distinguish polymorphic alleles from one another. In Table 6, ddNTPs are shown and the fourth nucleotide not shown is the dNTP.

TABLE 6: Extend Primers

Reference SNP ID	Extend Probe	Term Mix
rs1801706	CCTGGTGTCTCCTCCAGC	ACT
rs1047699	TGTCTTGCTGGTCTGTCCCTC	ACG
rs1948017	CAGCAACCATTGAGGGTGAAT	ACG
rs1498608	CCCTAAAACTGTTCCAGGTA	CGT

Reference SNP ID	Extend Probe	Term Mix
rs869975	GGGCCTCAGTAGTCCAGC	ACT

[0217] The MassEXTEND™ reaction was performed in a total volume of 9 µl, with the addition of 1X ThermoSequenase buffer, 0.576 units of ThermoSequenase (Amersham Pharmacia), 600 nM MassEXTEND™ primer, 2 mM of ddATP and/or ddCTP and/or ddGTP and/or ddTTP, and 2 mM of dATP or dCTP or dGTP or dTTP. The deoxy nucleotide (dNTP) used in the assay normally was complementary to the nucleotide at the polymorphic site in the amplicon. Samples were incubated at 94°C for 2 minutes, followed by 55 cycles of 5 seconds at 94°C, 5 seconds at 52°C, and 5 seconds at 72°C.

[0218] Following incubation, samples were desalted by adding 16 µl of water (total reaction volume was 25 µl), 3 mg of SpectroCLEAN™ sample cleaning beads (Sequenom, Inc.) and allowed to incubate for 3 minutes with rotation. Samples were then robotically dispensed using a piezoelectric dispensing device (SpectroJET™ (Sequenom, Inc.)) onto either 96-spot or 384-spot silicon chips containing a matrix that crystallized each sample (SpectroCHIP® (Sequenom, Inc.)). Subsequently, MALDI-TOF mass spectrometry (Biflex and Autoflex MALDI-TOF mass spectrometers (Bruker Daltonics) can be used) and SpectroTYPER RT™ software (Sequenom, Inc.) were used to analyze and interpret the SNP genotype for each sample.

Genetic Analysis

[0219] Variations identified in the target genes are provided in their respective genomic sequences (see SEQ ID NOs:1-4). Minor allelic frequencies for these polymorphisms was verified as being 10% or greater by determining the allelic frequencies using the extension assay described above in a group of samples isolated from 92 individuals originating from the state of Utah in the United States, Venezuela and France (Coriell cell repositories).

[0220] Genotyping results for the allelic variant set forth in Table 4 are shown for female pools in Table 7. In Table 7, "F case" and "F control" refer to female case (low BMD) and female control (high BMD) groups, and "AF" refers to allele frequency.

TABLE 7: Female Genotype Results

SNP Reference	F AF case (low)	F AF control (high)	p-value	Odds Ratio	Low BMD Associated Allele
rs1801706	A=0.15	A=0.19	0.00765	0.661	G
	G=0.85	G=0.81			
rs1047699	C=0.85	C=0.78	0.000594	1.65	C
	T=0.15	T=0.22			
rs1948017	C=0.14	C=0.10	0.0188	1.51	C
	T=0.86	T=0.90			
rs1498608	A=0.09	A=0.12	0.0347	0.672	T
	T=0.91	T=0.88			
rs869975	A=0.05	A=0.10	0.000243	0.441	G
	G=0.95	G=0.90			

[0221] The single marker alleles set forth in Table 7 were considered validated, since the genotyping data were significantly associated with low BMD, and because the genotyping results agreed with the original allelotyping results. Particularly significant associations with low BMD are indicated by a calculated p-value of less than 0.05 for genotype results, which are set forth in bold text.

[0222] Odds ratio results are shown in Table 7 (and other Tables below). An odds ratio is an unbiased estimate of relative risk which can be obtained from most case-control studies. Relative risk (RR) is an estimate of the likelihood of disease in the exposed group (susceptibility allele or genotype carriers) compared to the unexposed group (not carriers). It can be calculated by the following equation:

$$RR = IA/ Ia$$

IA is the incidence of disease in the A carriers and *Ia* is the incidence of disease in the non-carriers.

$RR > 1$ indicates the A allele increases disease susceptibility.

$RR < 1$ indicates the a allele increases disease susceptibility.

For example, $RR = 1.5$ indicates that carriers of the A allele have 1.5 times the risk of disease than non-carriers, *i.e.*, 50% more likely to get the disease.

[0223] Case-control studies do not allow the direct estimation of *IA* and *Ia*, therefore relative risk cannot be directly estimated. However, the odds ratio (OR) can be calculated using the following equation:

$$OR = (nDAnda)/(ndAnDa) = pDA(1 - pdA)/pdA(1 - pDA), \text{ or}$$

$$OR = ((\text{case } f) / (1 - \text{case } f)) / ((\text{control } f) / (1 - \text{control } f)), \text{ where } f = \text{susceptibility allele frequency.}$$

[0224] An odds ratio can be interpreted in the same way a relative risk is interpreted and can be directly estimated using the data from case-control studies, *i.e.*, case and control allele frequencies. The

higher the odds ratio value, the larger the effect that particular allele has on the development of low BMD. Possessing an allele associated with a relatively high odds ratio translates to having a higher risk of developing or having low BMD.

Example 3

CETP Region Proximal SNPs

[0225] It has been discovered that a polymorphic variation (rs1801706) in a gene encoding *CETP* is associated with the occurrence of low BMD (see Examples 1 and 2). Ninety-one additional allelic variants proximal to rs1801706 were identified and subsequently allelotyped in low BMD case and high BMD control sample sets as described in Examples 1 and 2. The polymorphic variants are set forth in Table 8. The chromosome positions provided in column four of Table 8 are based on Genome “Build 34” of NCBI’s GenBank. The “genome letter” corresponds to the particular allele that appears in NCBI’s build 34 genomic sequence of the region (chromosome 16: positions 56743155-56840953), and the “deduced iupac” corresponds to the single letter IUPAC code for the *CETP* polymorphic variants as they appear in SEQ ID NO:1. Also, the “genome letter” may differ from the alleles (A1/A2) provided in Table 8 (and in subsequent Tables that provide the same information) if the genome letter is on one strand and the alleles are on the complementary strand, thus having different strand orientations (*i.e.*, reverse vs forward).

TABLE 8

dbSNP	Position in SEQ ID NO:1	Chromo- some	Chromosome Position	Alleles (A1/A2)	Genome letter	Deduced iupac
7500979	205	16	56743155	g/a	g	R
2217332	1595	16	56744545	g/a	g	R
8044804	2650	16	56745600	c/t	a	R
2270835	5496	16	56748446	c/t	t	Y
2133783	5782	16	56748732	g/a	a	R
247609	5908	16	56748858	c/t	g	R
952440	7552	16	56750502	g/a	a	R
881598	9191	16	56752141	t/c	g	R
2291955	10127	16	56753077	g/a	t	Y
2518054	10345	16	56753295	g/a	g	R
866038	10399	16	56753349	t/c	c	Y
1436425	12028	16	56754978	g/a	a	R
173537	13355	16	56756305	a/g	t	Y
247811	13687	16	56756637	a/g	g	R
166017	14328	16	56757278	t/c	c	Y
173538	14746	16	56757696	c/t	t	Y
193694	14996	16	56757946	t/c	c	Y

P A T E N T
Docket SEQ-4095-PV

dbSNP	Position in SEQ ID NO:1	Chromo- some	Chromosome Position	Alleles (A1/A2)	Genome letter	Deduced iupac
7205692	19361	16	56762311	g/a	a	R
8048746	21775	16	56764725	g/a	a	R
247618	23250	16	56766200	g/a	g	R
183130	23810	16	56766760	c/t	c	Y
6499863	24464	16	56767414	g/a	g	R
4783961	27341	16	56770291	g/a	g	R
3816117	28605	16	56771555	c/t	t	Y
711752	28658	16	56771608	g/a	g	R
708272	28735	16	56771685	c/t	g	R
1864163	29680	16	56772630	g/a	g	R
4369653	29998	16	56772948	g/a	c	Y
1864165	32521	16	56775471	c/t	c	Y
891141	36170	16	56779120	t/g	g	K
891143	36427	16	56779377	c/t	t	Y
7205804	37336	16	56780286	g/a	g	R
5885	37718	16	56780668	c/t	c	Y
1532625	37748	16	56780698	a/g	c	Y
1532624	37926	16	56780876	t/g	c	M
289712	38752	16	56781702	g/a	c	Y
7499892	39037	16	56781987	c/t	c	Y
5883	39800	16	56782750	c/t	c	Y
289714	39898	16	56782848	c/t	g	R
158480	40674	16	56783624	c/t	g	R
289717	41835	16	56784785	c/t	g	R
4344729	42325	16	56785275	c/t	g	R
289718	42379	16	56785329	a/g	c	Y
289719	42388	16	56785338	g/a	t	Y
2033254	42432	16	56785382	c/t	t	Y
4784744	43632	16	56786582	g/a	g	R
291044	43899	16	56786849	c/t	g	R
8053613	44273	16	56787223	c/t	c	Y
5881	44459	16	56787409	a/g	g	R
5880	47538	16	56790488	c/g	g	S
7198026	47692	16	56790642	c/t	t	Y
5882	48539	16	56791489	g/a	g	R
8045701	48749	16	56791699	c/t	t	Y
289741	49921	16	56792871	a/g	g	R
1801706	50109	16	56793059	a/g	g	R
289742	50209	16	56793159	c/g	c	S
289743	50243	16	56793193	c/t	g	R
289746	52652	16	56795602	g/a	c	Y
172337	55195	16	56798145	c/t	t	Y
289747	56385	16	56799335	a/g	c	Y
1566439	57109	16	56800059	a/g	t	Y

dbSNP	Position in SEQ ID NO:1	Chromo- some	Chromosome Position	Alleles (A1/A2)	Genome letter	Deduced iupac
7205459	57618	16	56800588	c/t	t	Y
289749	58741	16	56801691	t/c	g	R
289751	59222	16	56802172	t/c	g	R
8059220	60771	16	56803721	c/t	c	Y
8058353	60962	16	56803912	g/a	g	R
289735	62009	16	56804959	a/g	c	Y
289737	64589	16	56807539	t/g	a	M
291042	66054	16	56809004	g/a	a	R
1875236	66143	16	56809093	c/t	g	R
821466	67822	16	56810772	a/g	t	Y
821465	68805	16	56811755	c/g	c	S
4275846	70075	16	56813025	c/t	g	R
289707	70350	16	56813300	a/g	t	Y
821463	71214	16	56814164	g/a	t	Y
289706	79549	16	56822499	c/t	c	Y
1167741	82760	16	56825710	c/t	c	Y
2052880	86463	16	56829413	a/c	g	K
1167742	86533	16	56829483	c/g	c	S
1183256	87019	16	56829969	a/g	a	R
1651665	88910	16	56831860	a/c	a	M
1651666	88955	16	56831905	c/t	c	Y
4784751	89021	16	56831971	c/t	c	Y
1651667	89056	16	56832006	a/g	a	R
8052091	89863	16	56832813	g/a	g	R
1684574	89879	16	56832829	t/c	t	Y
1684575	90066	16	56833016	t/g	g	K
1672865	90101	16	56833051	a/g	a	R
821470	91029	16	56833979	g/a	a	R
1549669	91434	16	56834384	t/g	a	M
291040	93636	16	56836586	t/c	t	Y
289754	98003	16	56840953	c/t	c	Y

Assay for Verifying and Allelotyping SNPs

[0226] The methods used to verify and allelotype the proximal SNPs of Table 8 are the same methods described in Examples 1 and 2 herein. The primers and probes used in these assays are provided in Table 9 and Table 10, respectively.

TABLE 9

dbSNP rs#	Forward PCR primer	Reverse PCR primer
-----------	--------------------	--------------------

dbSNP rs#	Forward PCR primer	Reverse PCR primer
7500979	TTGTATATGTAGGGTCTGC	AAAATAATTCAAAACCACTG
2217332	ATCCAACAACAGCTTCCCAG	GGTGAAATGCTGACCTGTGT
8044804	ATAAATACAACCCAGCCAC	CATTTCAATTCCTGCACTG
2270835	CATTACCATGTAAGTCCG	GGGTTGAGTATGAACAAATG
2133783	ACACTCATCCCTCCATTCTG	TCCCGGGAATTGAAGGGAAT
247609	GTCATAAACTATGTATCAG	GGGTAGAGTGTAATGACAG
952440	AGTCAGTGCCTGACTTTACC	CATACTGAGGCATGGAACAG
881598	ACTGCACTCCAGCCTGGGTGA	TGCTCCTGGCAGCAAATATC
2291955	GCTAGACATGTTTTAGCAGG	CCCCTTAGTTTAAAGTAAAGC
2518054	CTGATCATTCTTACCGGCAC	CTAGACAGTCAACAACTGAG
866038	CAAGGAACAAAGCAAGACCC	GTGCCGGTAAGAATGATCAG
1438425	GTATTCAGAGTGGTGTGTGG	GGGACATGGCAGAAATTCAG
173537	TCCCTGTCTTGAACATC	CCTCTTGGGTCTTGTAGTCG
247611	AGGGTCCCTCCATGATTGGAG	TTTCTGGACCTGACTGGGTG
168017	TAGATGGGCTGTTTCTACTG	AGGGAAGATTCCAGTAAAGC
173538	TCCCAAAGTGCTGGGATTAC	GGGTTTCTCAAAGGGCTAAG
193694	TCCTTCCGTGATCTCACAAC	CACACCAAAGAAGTGCATG
7205692	TCTTAGCCTGGGACTTTCTG	AAAAGCAGCTGTGACCTAAG
8048746	CAAGTCTTCTCCATCCAC	TTCTCTCTCTGGGCTTATC
247618	TTTTCCCCCTTTTGGGGC	TGGGTTGTACAGCAAGGTGG
183130	ATAAACGGGAAAGAAGAGAC	AGGGTGGAGAATCTACAGAA
6499863	GTCTTGACAGGTTTGAGGAG	CATCAGACAGATCCCAACAG
4783961	GAAACATGAGTCGGGATGGC	AGCTTTGGTATTGGAGCAGG
3816117	ACTAGCCCAGAGAGAGGAGT	AAGAAGTACCTTGAAGGC
711752	CACAAATCCCTATACCTGGC	TGCCTTCAAGGTCAAGTTC
708272	AACCTGGCTCAGATCTGAAC	GCCAGGTATAGGGATTTGTG
1864163	TTAGAGGGGCTGTTGGAGAG	AGAGCCTGACACCTTCCCTA
4369653	AGTATCTTGACTTTATTTGG	GAAAAAATATATGATAAAGG
1864165	TAAAAGGCTAGAAGTCCACC	AATTAATTCTCCCTATAGC
891141	AGGCCAGCCTGGGAAGTTT	TATCAGATGGTATCCACATG
891143	TCGTGCCCATCCTGTTAGTG	CACAAGCATGCCCTGTGTGG
7205804	AGGCAGCAAGCACCAATG	ATGAACGGTGCCTGGTACAC
5885	GCAAAGAGATCAACGTCATC	ATGCAGACAGAAACGCACTCA
1532625	ACTGCTGTCTTCTGAGGCAT	CATCATGGCCGATTTTGTCC
1532624	TCTATAGACTTGCCCAACGC	TACTTTGGCAAATCTCTGCC
289712	ATTCGGCTTCTGTCATCCTC	GGGTCAAAGCTTTTGTGAG
7499892	TGGCTGACTGGCCTGACCAC	CCCTCCATTCTGTACCACTTA
5883	TACTTCTGGTCTCTGAGCG	TTGAACTCGTCTCCCATCAG
289714	ACACACACATACCACATGCC	TGATGGGAGACGAGTTCAAG
158480	TGAGTAGTTGGGACTATAGG	ACCCCTGTCTCTACAAAAT
289717	CTCTGAGCCAGAGTTGATC	CATTCCCTGCTCCATTCCC
4344729	GCCTGAGTTCAGAAGGGAAG	GGCCGTTCTCTGTTCTAAC
289718	GCCTGCCCAATATTGTGAGT	TCTTCCCTTCTGAACTCAGG
289719	TCTTCCCTTCTGAACTCAGG	GCCTGCCCAATATTGTGAGT

dbSNP rs#	Forward PCR primer	Reverse PCR primer
2033254	CACAACTCACAATATTGGGC	CAAAGGAACAGGACTCAGAC
4784744	ATCACATGCCCCAAGAAACC	CCGGCCCTTTCTTTCTTTTG
291044	AGGGCATCCCAGAACAGAAC	TGACTAGGTCAGGTCCCCTC
8053613	GAGTTCAGGGTAGGAATAGC	GCTGTGCAAATTAGGACTCT
5881	GACCCCTGTCTTCCACAGGT	ATCTTGGGCATCTTGAGGCA
5880	TTTCTCTCCCCAGGATATCG	CCAAGAGGCTTAAGAAGAGC
7198026	TGTTGGTGGGAAATGTGGC	ACGAAGATTCTATCTAGGCA
5882	TCCAGGGAGGACTCACCATG	TGACTGCAGGAAGCTCTGG
8045701	TTGATACTTAGCGGTCTGG	TAATATTCTGCAGGTAACC
289741	TCTACCAGCTTGGCTCCCTC	AAGGGAGGGGCAGTAGGAGA
1801706	GTAGCAGAAGGCAAGCAC	AGGGAGGAGTTGGGAGCC
289742	ACTGGTGAGACAATCCCTTC	CCACTGGCATTAAAGTGCTG
289743	TGAAAAGAGGTGGACGGCAC	AGTCCTTCTTCTGTGGCTGG
289748	GAGGCTTACCAAAATGGGAC	AGAGCTTCTAGGCTTGGATG
172337	AGCTGGACTTTGAGGATGGC	AAGGAGAGGAGGGGACTGGAG
289747	GTTGTTTAGGCCAAAAAGTC	CAATTACGGAAGTTACACTG
1566439	AAGCCCATGGCTTTTCAAGG	AGATCCTGGAGCCTCATTGT
7205459	GCAGAGGGGAAAGATCTTGG	AAGAGGGTATGTGTGTTGG
289749	TGAACTAAGGACCAGGCAAG	GCTCACATCCTTAGATTGCC
289751	AAATGATATGGAATTATGCG	TATCTTTCCAAATGTTTTAC
8059220	ACCTGCCATCATGAGTGCAT	TAGAGCAGGGCCTGGTGTGT
8058353	CCCTACAAGAAGGCTACATC	AGTGAAGTGCAGTGAAGAAGG
289735	CAAGGCATGCATGCTCCTTC	ATCGCCAGACCCTCAAGAAC
289737	GCAAGGAAGACTGATTCTGTG	AGCCTCAAGTCACTGATGTC
291042	TGTCTCCCCATAACCAACAC	AAGAAACAGCTCCCAGTCTG
1875238	GAGCTGAGTGATTCTTGTC	AATATGGTCAACTTGGTGGC
821466	AAGGAAGGAAGTGAGGGATG	GGAAAGCAAAGGAATGGCAG
821465	CACTGTTTACAATAGCCAAG	TGGAATTACAGGCGTGAGCT
4275848	GCAGCTGAGCAAAGATATGG	TGGACCTCTTCTATCATCAC
289707	CTCCTTCCTTCTGCTATCTC	ACCAAGATTACAGGCACTGAG
821463	CGTCTGCTGGGACACTGAAA	GCACCTGGAAGATTATGGG
289708	TTAAGTCCTTTACCAAAGGG	TGAATGTGGCTTTACCAAGG
1167741	GCCCTATTTACGTGGATTTG	GCTCTGATTGTGTCTCTGTG
2052880	CATCAAGACTCCATGGAGAG	AGTCAAGAACCAGTCCCTAC
1167742	CCCTAGAAACTCCCTTATCC	TGAGTGGGGTACAGATGAAC
1183256	AGCTCAACTCCCCCAAGTT	GAAGATAGGTGAGTTGAGGG
1651665	AAGTGAGAACAGGCTTCCTG	TCAAGGCTTTAGCTTGTCCT
1651666	TCTAACCTGGAACCCCTCAG	ATGAAGCCTGACACTTTGGG
4784751	CAAAGTGTGAGGCTTCATGG	AGCTGTGGGTGAGTGCAAG
1651667	TCCCGACTTGACACCTTGG	AGAAAATCAGCCAAAGGCTC
8052091	AGTCTTGCAGTCCAGGATG	TTCCCTGATGGACAGATGGC
1684574	TCTTGCAGTCCAGGATGCAG	GGCCATTTAGTGCTTGGAGC
1684575	TTTCCAGTCCCTGCATGTG	GAGGGGTTACCCAGAACCCTT
1672865	AAAGGTTCTGGGTAACCCCT	CAGGCCTGAAAAGCAAAGG

dbSNP rs#	Forward PCR primer	Reverse PCR primer
821470	CCTCTTTCTGTAATATCTGG	CTGGGCATTGCAGAACTGAA
1549669	CTGCAATAGTACACGTGGTG	AGATGTTGCAAAGGAGGTGC
291040	TACACTTGCCCAAAGTCCAC	TCTCTCTGTCAATCATGGGC
289754	ACTGCTTAGGTTGGCAAAGG	ATGCTTCCTTCCACAGGGAC

TABLE 10

dbSNP rs#	Extend Primer	Term Mix
7500979	TCAACCAATAGAAAAGGC	ACG
2217332	AACCTCTGGTCCTCTGGA	ACG
8044804	TAAGCCTTGGTATGATAC	ACG
2270835	GCCGTAAATTCCATTCTTC	ACG
2133783	CTGAACTTTACAGGTAACA	ACG
247809	AAACTATGTATCAGACAAAAGCAC	ACG
952440	CCTGGAAGGCAGCTGTGG	ACG
881598	CAGCCTGGGTGACAGAGC	ACT
2291955	GACTTTTCTAGGAAAGACTTA	ACG
2518054	TACCGGCACAAACAGTC	ACG
866038	CCCATCTCAAAAACAAAAAC	ACT
1436425	GGTGTGTGGCCCATGAT	ACG
173537	CATCACACCTGTCTGCCATC	ACT
247611	CTCCATGATTGGAGACTGACA	ACT
166017	CTACTGGCAGGGAACAT	ACT
173538	TTACAGGCGTAAGCCAC	ACG
193694	CTTAAATCTACTCCCATACAT	ACT
7205692	CAAAAGAGTTAGGGGAG	ACG
8048746	CATGCCAAAATCTCGCC	ACG
247618	TTGGGGCCCCATGTAAA	ACG
183130	CTTCTGTGCAGGAGAAT	ACG
6499863	TTGAGGAGCAGTGGTCA	ACG
4783961	GGGTCCTGCCCTAGTCC	ACG
3816117	GAGGGAGATGGGCTGAG	ACG
711752	CAATGCAGCTAGGACCTTCT	ACG
708272	CTGGCTCAGATCTGAACCCTAAT	ACG
1864163	GGCTGTTGGAGAGGTTGATA	ACG
4369653	CAGGTGCTTTTACAAACAA	ACG
1864165	GTCCACCATGGCCCTCC	ACG
891141	CTGGGAAGTTTGCAGGG	ACT
891143	AGTGTGTCCACGGCTCC	ACG
7205804	CCTGTGCATCCATGGAG	ACG
5885	CATCTCTAACATCATGGC	ACG
1532625	TGAGGCATGCAGACAGAAAC	ACT
1532624	CAACGCCACACAGCTTGTGA	ACT
289712	CAGTGGATTGTGGCCCCC	ACG
7499892	AGCCCCGTTGGCCTGAAC	ACG
5883	GTTCTCTGAGCGAGTCTT	ACG
289714	CATACCACATGCCATCTGGAT	ACG
158480	GGGACTATAGGTATGCAC	ACG
289717	TTCCAGCCCCCTACAAGTC	ACG
4344729	CAGAAGGGAAGAGGGAC	ACG

dbSNP rs#	Extend Primer	Term Mix
289718	TATGTGCAAGGAGAGAG	ACT
289719	CTGTGATGCCTCTCTCC	ACG
2033254	GGCAGGCCCTGACCGGC	ACG
4784744	CCAAGAAACCACTGAAC	ACG
291044	AGTATTTAAAGGAGAGACACAC	ACG
8053613	GATGAGAACTGAGGCC	ACG
5881	TTCCACAGGTTGTCGGC	ACT
5880	ATATCGTGACTACCGTCCAG	ACT
7198026	GAAATGTGGCCCTTTC	ACG
5882	CAGAGCAGCTCCGAGTCC	ACT
8045701	CCTCTCCCTGCTGGTGG	ACG
289741	TGGGAGTCAGCCCAGCTC	ACT
1801706	CCTGGTGTCTCCTCCAGC	ACT
289742	GCCACAGAAGAAGGACTCC	ACT
289743	TGAGACAATCCCTTCCCCC	ACG
289746	TACCAAAATGGGACTGACCTC	ACG
172337	TTTGAGGATGGCCCTGAC	ACG
289747	TAGGCCAAAAAGTCTAAATTGC	ACT
1568439	CCTTAGAGAAACGGAAGGTG	ACT
7205459	ACTTTATTCCTGGATCAGA	ACG
289749	CAGGCAAGCTAATGCAA	ACT
289751	TGGAATTATGCGTTAAAGG	ACT
8059220	TGCATTGAGCTTCTCCA	ACG
8058353	CTACATCTGCCTCTCTATC	ACG
289735	GAGGGACAGAAGGGACC	ACT
289737	CTTACTTGTGTGGTTTAGAAT	ACT
291042	CCCATAACCAACACTCAGCT	ACG
1875236	GATTCTTGTCTCTGAGAGC	ACG
821466	GAGGACAGGAGTGGAGCC	ACT
821465	ACAGAGAAAATGTGGCA	ACT
4275846	GATATGGTTTCAAAGCCT	ACG
289707	TGCCATTCTCTAGGCCCGTC	ACT
821483	TGGGACACTGAAACCAGGG	ACG
289706	ACCAAAGGGATTGACTT	ACG
1167741	GAACCTCTGAGTTACATTCC	ACG
2052880	CTTCCCTGCCTATTTTATGTC	ACT
1167742	CTTATCCCCCAACTCACCTT	ACT
1183256	TCATCTGCCCCAGTTT	ACT
1851665	AGGGGTTCCAGGTTAGACCCTT	ACT
1851666	AGGAAGCCTGTTCTCACTTTC	ACG
4784751	TCATGGGGAAGCCCTAA	ACG
1651667	CTTGTACACCTTGGACTTGAC	ACT
8052091	CAACAGCCAGCAGCCCC	ACG
1884574	GATGCAGGAAGCAGGGCC	ACT

dbSNP rs#	Extend Primer	Term Mix
1684575	CACCTGTCTGTGGACTGGA	ACT
1672865	GGGTAACCCCTCAGCCCAG	ACT
821470	TCTGGATCCCCAGTGCC	ACG
1549689	TAGTACACGTGGTGTAAAGG	ACT
291040	CCAAAGTCCACCAGCCTCT	ACT
289754	CAAAGGATTTAACTTCTCTAG	ACG

Genetic Analysis

[0227] Allelotyping results are shown for female cases and controls in Table 11. The allele frequency for the A2 allele is noted in the fifth and sixth columns for control pools and case pools, respectively, where “AF” is allele frequency. Some SNPs do not have an allele frequency disclosed because of failed assays.

TABLE 11

dbSNP rs#	Position in SEQ ID NO: 1	Chromosome Position	A1/A2 Allele	High AF	Low AF	p-Value	OR	Low BMD Associated Allele
7500979	205	56743155	G/A	G=0.71	G=0.72	0.6029	1.07	G
				A=0.29	A=0.28			
2217332	1595	56744545	G/A	G=0.85	G=0.84	0.5390	0.90	A
				A=0.15	A=0.16			
8044804	2650	56745600	C/T	C=0.47	C=			
				T=0.53	T=			
2270835	5496	56748446	C/T	C=0.00	C=0.00			
				T=1.00	T=1.00			
2133783	5782	56748732	G/A	G=0.41	G=0.44	0.3412	1.14	G
				A=0.59	A=0.56			
247609	5908	56748858	C/T	C=0.70	C=0.70	0.8844	1.02	C
				T=0.30	T=0.30			
952440	7552	56750502	G/A	G=0.31	G=0.30	0.8410	0.97	A
				A=0.69	A=0.70			
881598	9191	56752141	T/C	T=0.23	T=0.25	0.4703	1.11	T
				C=0.77	C=0.75			
2291955	10127	56753077	G/A	G=0.00	G=0.00			
				A=1.00	A=1.00			
2518054	10345	56753295	G/A	G=0.87	G=0.91	0.0835	1.47	G
				A=0.13	A=0.09			
866038	10399	56753349	T/C	T=0.49	T=0.51	0.5835	1.07	T
				C=0.51	C=0.49			
1436425	12028	56754978	G/A	G=0.39	G=0.38	0.7660	0.96	A
				A=0.61	A=0.62			

dbSNP rs#	Position in SEQ ID NO: 1	Chromo- some Position	A1/A2 Allele	High AF	Low AF	p-Value	OR	Low BMD Associated Allele
173537	13355	56756305	A/G	A=0.80 G=0.20	A=0.81 G=0.19	0.8011	1.04	A
247611	13687	56756637	A/G	A=0.38 G=0.62	A=0.39 G=0.61	0.7529	1.04	A
166017	14328	56757278	T/C	T=0.29 C=0.71	T=0.43 C=0.57	0.00001	1.80	T
173538	14746	56757696	C/T	C=0.68 T=0.32	C=0.67 T=0.33	0.5702	0.93	T
193694	14996	56757946	T/C	T=0.14 C=0.86	T=0.24 C=0.76	0.0015	2.02	T
7205692	19361	56762311	G/A	G=0.01 A=0.99	G=0.01 A=0.99			
8048746	21775	56764725	G/A	G=0.00 A=1.00	G=0.00 A=1.00			
247618	23250	56766200	G/A	G=0.28 A=0.72	G=0.29 A=0.71	0.5339	1.08	G
183130	23810	56766760	C/T	C=0.64 T=0.36	C=0.59 T=0.41	0.0720	0.80	T
6499863	24464	56767414	G/A	G=0.83 A=0.17	G=0.84 A=0.16	0.5810	1.09	G
4783961	27341	56770291	G/A	G=0.48 A=0.52	G=0.46 A=0.54	0.3803	0.90	A
3816117	28605	56771555	C/T	C=0.56 T=0.44	C=0.55 T=0.45	0.8019	0.97	T
711752	28658	56771608	G/A	G=0.59 A=0.41	G=0.58 A=0.42	0.6887	0.95	A
708272	28735	56771685	C/T	C=0.62 T=0.38	C=0.62 T=0.38	0.9629	1.01	C
1864163	29680	56772630	G/A	G=0.74 A=0.26	G=0.74 A=0.26	0.9938	1.00	G
4369653	29998	56772948	G/A	G=0.37 A=0.63	G=0.37 A=0.63	0.8163	0.97	G
1864165	32521	56775471	C/T	C=1.00 T=0.00	C=1.00 T=0.00			
891141	36170	56779120	T/G	T=1.00 G=0.00	T=1.00 G=0.00			
891143	36427	56779377	C/T	C=1.00 T=0.00	C=1.00 T=0.00			
7205804	37336	56780286	G/A	G=0.72 A=0.28	G=0.78 A=0.22	0.0212	1.41	G
5885	37718	56780668	C/T	C=1.00 T=0.00	C=1.00 T=0.00			
1532625	37748	56780698	A/G	A=0.60	A=0.61	0.6329	1.06	A

dbSNP rs#	Position in SEQ ID NO: 1	Chromo- some Position	A1/A2 Allele	High AF	Low AF	p-Value	OR	Low BMD Associated Allele
				G=0.40	G=0.39			
1532624	37926	56780876	T/G	T=0.64	T=0.64	0.9807	1.00	T
				G=0.36	G=0.36			
289712	38752	56781702	G/A	G=0.68	G=0.67	0.6644	1.08	G
				A=0.34	A=0.33			
7499892	39037	56781987	C/T	C=0.88	C=0.88	0.9632	1.01	C
				T=0.12	T=0.12			
5883	39800	56782750	C/T	C=0.95	C=0.96	0.8994	1.04	C
				T=0.05	T=0.04			
289714	38898	56782848	C/T	C=0.19	C=0.23	0.0972	1.28	C
				T=0.81	T=0.77			
158480	40674	56783624	C/T	C=0.59	C=0.56	0.3315	0.86	T
				T=0.41	T=0.44			
289717	41835	56784785	C/T	C=0.67	C=0.72	0.1148	1.25	C
				T=0.33	T=0.28			
4344729	42325	56785275	C/T	C=1.00	C=1.00			
				T=0.00	T=0.00			
289718	42379	56785329	A/G	A=	A=0.20			
				G=	G=0.80			
289719	42388	56785338	G/A	G=	G=0.39			
				A=	A=0.61			
2033254	42432	56785382	C/T	C=0.34	C=0.38	0.1947	1.17	C
				T=0.66	T=0.62			
4784744	43632	56786582	G/A	G=0.83	G=0.64	0.5113	1.08	G
				A=0.37	A=0.36			
291044	43899	56786849	C/T	C=0.65	C=0.65	0.9866	1.01	C
				T=0.35	T=0.35			
8053613	44273	56787223	C/T	C=1.00	C=1.00			
				T=0.00	T=0.00			
5881	44459	56787409	A/G	A=0.00	A=0.00			
				G=1.00	G=1.00			
5880	47538	56790488	C/G	C=0.09	C=0.09	0.9339	1.02	C
				G=0.91	G=0.91			
7198026	47692	56790642	C/T	C=0.00	C=0.00			C
				T=1.00	T=1.00			
5882	48539	56791489	A/G	A=0.76	A=0.80	0.0958	1.27	A
				G=0.24	G=0.20			
8045701	48749	56791699	C/T	C=0.00	C=0.00			
				T=1.00	T=1.00			
289741	49921	56792871	A/G	A=0.85	A=0.86	0.5974	1.09	A
				G=0.15	G=0.14			
1801706	50109	56793059	A/G	A=0.31	A=0.23	0.0025	0.67	G
				G=0.69	G=0.77			

dbSNP rs#	Position in SEQ ID NO: 1	Chromo- some Position	A1/A2 Allele	High AF	Low AF	p-Value	OR	Low BMD Associated Allele
289742	50209	56793159	C/G	C=0.91	C=0.92	0.6298	1.12	C
				G=0.09	G=0.08			
289743	50243	56793193	C/T	C=0.27	C=0.24	0.1869	0.84	T
				T=0.73	T=0.76			
289746	52652	56795602	G/A	G=0.72	G=0.72	0.8916	0.98	G
				A=0.28	A=0.28			
172337	55195	56798145	C/T	C=0.94	C=0.91	0.0886	0.67	T
				T=0.06	T=0.09			
289747	56385	56799335	A/G	A=0.49	A=0.54	0.0981	1.22	A
				G=0.51	G=0.46			
1566439	57109	56800059	A/G	A=0.66	A=0.65	0.8578	0.98	G
				G=0.34	G=0.35			
7205459	57618	56800568	C/T	C=0.16	C=0.10	0.0035	0.59	T
				T=0.84	T=0.90			
289749	58741	56801691	T/C	T=	T=0.42			
				C=	C=0.58			
289751	59222	56802172	T/C	T=0.98	T=0.94			
				C=0.02	C=0.06			
8059220	60771	56803721	C/T	C=1.00	C=1.00			
				T=0.00	T=0.00			
8058353	60962	56803912	G/A	G=0.98	G=0.95			
				A=0.02	A=0.05			
289735	62009	56804959	A/G	A=	A=0.39			
				G=	G=0.61			
289737	64589	56807539	T/G	T=	T=0.28			
				G=	G=0.72			
291042	66054	56809004	G/A	G=0.80	G=0.82	0.4548	1.12	G
				A=0.20	A=0.18			
1875236	66143	56809093	C/T	C=0.91	C=0.90	0.3106	0.80	T
				T=0.09	T=0.10			
821466	67822	56810772	A/G	A=0.77	A=0.76	0.6743	0.94	G
				G=0.23	G=0.24			
821465	68805	56811755	C/G	C=0.93	C=0.87	0.0041	0.54	G
				G=0.07	G=0.13			
4275846	70075	56813025	C/T	C=1.00	C=1.00			
				T=0.00	T=0.00			
289707	70350	56813300	A/G	A=0.44	A=0.46	0.6117	1.07	A
				G=0.56	G=0.54			
821463	71214	56814164	G/A	G=0.38	G=0.41	0.4281	1.10	G
				A=0.62	A=0.59			
289706	79549	56822499	C/T	C=0.00	C=0.00			
				T=1.00	T=1.00			
1167741	82760	56825710	C/T	C=0.45	C=0.46	0.7635	1.04	C

dbSNP rs#	Position in SEQ ID NO: 1	Chromo- some Position	A1/A2 Allele	High AF T=0.55 A=0.67 C=0.33	Low AF T=0.54 A=0.68 C=0.32	p-Value	OR	Low BMD Associated Allele
2052880	86463	56829413	A/C	A=0.67 C=0.33	A=0.68 C=0.32	0.8378	1.03	A
1167742	86533	56829483	C/G	C=0.70 G=0.30	C=0.69 G=0.31	0.7322	0.96	G
1183256	87019	56829969	A/G	A=1.00 G=0.00	A=1.00 G=0.00			
1651665	88910	56831860	A/C	A=0.30 C=0.70	A=0.35 C=0.65	0.1423	1.24	A
1651666	88955	56831905	C/T	C=0.71 T=0.29	C=0.67 T=0.33	0.1294	0.81	T
4784751	89021	56831971	C/T	C=0.70 T=0.30	C=0.73 T=0.27	0.1971	1.18	C
1651667	89056	56832006	A/G	A=0.44 G=0.56	A=0.47 G=0.53	0.2902	1.13	A
8052091	89863	56832813	G/A	G=1.00 A=0.00	G=1.00 A=0.00			
1684574	89879	56832829	T/C	T=0.01 C=0.99	T= C=			
1684575	90066	56833016	T/G	T=0.65 G=0.35	T=0.67 G=0.33	0.3473	1.12	T
1672865	90101	56833051	A/G	A=0.49 G=0.51	A=0.50 G=0.50	0.6959	1.05	A
821470	91029	56833979	G/A	G=0.37 A=0.63	G=0.38 A=0.62	0.8340	1.03	G
1549669	91434	56834384	T/G	T=0.51 G=0.49	T=0.50 G=0.50	0.9075	0.99	G
291040	93636	56836586	T/C	T=0.76 C=0.24	T=0.74 C=0.26	0.4056	0.89	C
289754	98003	56840953	C/T	C=0.70 T=0.30	C=0.69 T=0.31	0.6508	0.84	T

[0228] Allelotyping results were considered particularly significant with a calculated p-value of less than or equal to 0.05 for allelotype results. These values are indicated in bold. The allelotyping p-values were plotted in Figure 1. The position of each SNP on the chromosome is presented on the x-axis. The y-axis gives the negative logarithm (base 10) of the p-value comparing the estimated allele in the case group to that of the control group. The minor allele frequency of the control group for each SNP designated by an X or other symbol on the graphs in Figure 1 can be determined by consulting Table 11. For example, the left-most X on the left graph is at position 56743155. By proceeding down the Table

from top to bottom and across the graphs from left to right the allele frequency associated with each symbol shown can be determined.

[0229] To aid the interpretation, multiple lines have been added to the graph. The broken horizontal lines are drawn at two common significance levels, 0.05 and 0.01. The vertical broken lines are drawn every 20kb to assist in the interpretation of distances between SNPs. Two other lines are drawn to expose linear trends in the association of SNPs to the disease. The light gray line (or generally bottom-most curve) is a nonlinear smoother through the data points on the graph using a local polynomial regression method (W.S. Cleveland, E. Grosse and W.M. Shyu (1992) Local regression models. Chapter 8 of Statistical Models in S eds J.M. Chambers and T.J. Hastie, Wadsworth & Brooks/Cole.). The black line provides a local test for excess statistical significance to identify regions of association. This was created by use of a 10kb sliding window with 1kb step sizes. Within each window, a chi-square goodness of fit test was applied to compare the proportion of SNPs that were significant at a test wise level of 0.01, to the proportion that would be expected by chance alone (0.05 for the methods used here). Resulting p-values that were less than 10^{-8} were truncated at that value.

[0230] Finally, the exons and introns of the genes in the covered region are plotted below each graph at the appropriate chromosomal positions. The gene boundary is indicated by the broken horizontal line. The exon positions are shown as thick, unbroken bars. An arrow is place at the 3' end of each gene to show the direction of transcription.

Example 4

PROL4 Proximal SNPs

[0231] It has been discovered that a polymorphic variation (rs1047699) in a gene encoding *PROL4* is associated with the occurrence of low BMD (see Examples 1 and 2). One hundred twenty-five additional allelic variants proximal to rs1047699 were identified and subsequently allelotyped in low BMD case and high BMD control sample sets as described in Examples 1 and 2. The polymorphic variants are set forth in Table 12. The chromosome position provided in column four of Table 12 is based on Genome "Build 34" of NCBI's GenBank.

TABLE 12

dbSNP	Position in SEQ ID NO:2	Chromosome	Chromosome Position	Alleles (A1/A2)	genome letter	deduced iupac
523051	229	12	10842129	t/c	g	R
693620	368	12	10842268	t/c	a	R
2588349	583	12	10842483	g/a	g	R
2588350	2424	12	10844324	t/c	t	Y

P A T E N T
Docket **SEQ-4095-PV**

dbSNP	Position in SEQ ID NO:2	Chromosome	Chromosome Position	Alleles (A1/A2)	genome letter	deduced iupac
619381	3625	12	10845525	c/t	c	Y
3759252	3709	12	10845609	c/a	g	K
3759251	3750	12	10845650	t/a	t	W
2418107	4724	12	10846624	g/c	g	S
7303054	4781	12	10846681	t/c	c	Y
1838345	6161	12	10848061	a/g	g	R
620878	7097	12	10848997	t/g	g	K
2537817	8025	12	10849925	t/c	t	Y
1548803	8398	12	10850298	c/t	c	Y
667123	10144	12	10852044	g/a	a	R
1838346	10384	12	10852284	a/g	g	R
2159903	11116	12	10853016	a/g	g	R
3944035	11132	12	10853032	a/g	g	R
3741845	11482	12	10853382	t/c	a	R
2110096	14544	12	10856444	c/t	c	Y
759055	15688	12	10857588	t/a	t	W
589377	17311	12	10859211	g/c	g	S
7960194	17831	12	10859731	g/t	t	K
7978242	20012	12	10861912	a/g	g	R
601051	21997	12	10863897	g/a	g	R
4262797	22861	12	10864761	a/g	a	R
2215714	23470	12	10865370	a/g	g	R
1373434	23515	12	10865415	g/a	g	R
2215715	23863	12	10865763	g/a	g	R
612456	24108	12	10866008	c/a	c	M
612808	24138	12	10866038	t/c	c	Y
689118	26469	12	10868369	t/c	t	Y
597468	27769	12	10869669	a/g	g	R
592864	29683	12	10871583	t/c	t	Y
640372	30491	12	10872391	a/c	c	M
7966559	30745	12	10872645	a/t	a	W
654834	31429	12	10873329	t/c	t	Y
4763216	31779	12	10873679	c/g	c	S
668521	32194	12	10874094	a/c	c	M
669503	32441	12	10874341	t/c	c	Y
3906864	32454	12	10874354	t/c	g	R
3906863	32459	12	10874359	c/t	a	R
7957888	35151	12	10877051	a/t	t	W
9300230	35362	12	10877262	a/t	t	W
7306214	35630	12	10877530	g/c	g	S
763839	36930	12	10878830	g/c	g	S
2418105	37490	12	10879390	g/a	g	R
666841	38432	12	10880332	c/t	c	Y
3851578	38688	12	10880588	a/g	g	R

P A T E N T
Docket SEQ-4095-PV

dbSNP	Position in SEQ ID NO:2	Chromosome	Chromosome Position	Alleles (A1/A2)	genome letter	deduced iupac
7138797	39524	12	10881424	t/c	c	Y
7295252	41580	12	10883480	a/c	a	M
2418108	42531	12	10884431	t/c	t	Y
7299578	42665	12	10884565	a/g	a	R
621112	43038	12	10884938	a/g	a	R
3863320	44183	12	10886083	g/a	g	R
1373432	46271	12	10888171	a/t	t	W
1047699	49075	12	10890975	c/t	t	Y
1063193	49147	12	10891047	c/t	c	Y
2232959	49180	12	10891080	c/g	g	S
2227296	50301	12	10892201	a/g	a	R
1548804	50773	12	10892673	g/a	g	R
2232958	51243	12	10893143	g/a	c	Y
2232957	51530	12	10893430	t/c	a	R
2232956	52107	12	10894007	a/g	c	Y
1972571	52821	12	10894721	a/g	a	R
3759250	53341	12	10895241	t/c	a	R
3759249	53376	12	10895276	c/g	g	S
1541525	54047	12	10895947	c/t	t	Y
2098248	54392	12	10896292	t/c	t	Y
2900550	54482	12	10896382	t/a	a	W
7302130	55468	12	10897368	c/a	a	M
4763583	56990	12	10898890	a/g	a	R
4360778	57712	12	10899612	a/t	a	W
1607695	59667	12	10901567	c/t	a	R
1607694	59684	12	10901584	t/c	g	R
2192139	62043	12	10903943	a/c	a	M
7978300	63293	12	10905193	t/c	t	Y
7397871	63485	12	10905385	g/t	g	K
4763217	63778	12	10905678	c/t	t	Y
2159900	64222	12	10906122	a/g	a	R
10772370	65722	12	10907622	a/g	a	R
7398682	66315	12	10908215	c/t	c	Y
2900551	66829	12	10908729	a/g	a	R
2900552	66966	12	10908866	c/t	c	Y
2418214	66971	12	10908871	a/c	c	M
2418215	67013	12	10908913	t/c	c	Y
965243	70375	12	10912275	a/t	t	W
1117548	74118	12	10916018	t/a	t	W
1520225	75224	12	10917124	c/t	c	Y
1520226	75236	12	10917136	t/c	t	Y
1520227	75246	12	10917146	g/c	g	S
971919	75812	12	10917712	c/a	a	M
2159901	78968	12	10920868	c/t	t	Y

dbSNP	Position in SEQ ID NO:2	Chromosome	Chromosome Position	Alleles (A1/A2)	genome letter	deduced iupac
2159902	78998	12	10920898	t/c	t	Y
2110099	79328	12	10921228	a/c	c	M
7314847	80922	12	10922822	t/c	t	Y
7296003	81055	12	10922955	t/c	c	Y
4281556	81412	12	10923312	g/a	a	R
4763219	81785	12	10923685	a/g	g	R
3851579	82079	12	10923979	g/a	a	R
3851580	82087	12	10923987	g/a	g	R
1049119	82958	12	10924858	a/g	c	Y
2298866	83351	12	10925251	t/g	a	M
2298865	83442	12	10925342	c/t	a	R
2298864	83472	12	10925372	a/c	t	K
2298863	83966	12	10925866	a/g	t	Y
3180393	84414	12	10926314	t/c	t	Y
2070837	86563	12	10928463	c/g	c	S
7956204	86788	12	10928688	g/a	g	R
2418216	86796	12	10928696	t/g	t	K
3741844	87634	12	10929534	g/a	c	Y
4262798	88530	12	10930430	g/a	a	R
2418217	89202	12	10931102	a/g	a	R
2418218	89632	12	10931532	t/c	t	Y
7137492	89697	12	10931597	t/c	t	Y
2110100	89723	12	10931623	g/a	g	R
1013312	91063	12	10932963	c/g	c	S
4579993	91335	12	10933235	c/g	g	S
1013313	91504	12	10933404	t/c	t	Y
7397106	91619	12	10933519	c/t	t	Y
2215716	93715	12	10935615	a/g	g	R
2192140	93945	12	10935845	t/c	c	Y
4763589	94235	12	10936135	t/c	t	Y
1468697	95851	12	10937751	t/c	c	Y
2070837	130860	12	10972760	c/g	c	S
3180393	132815	12	10974715	t/c	a	R
2298865	133778	12	10975678	c/t	t	Y

Assay for Verifying and Allelotyping SNPs

[0232] The methods used to verify and allelotype the proximal SNPs of Table 12 are the same methods described in Examples 1 and 2 herein. The primers and probes used in these assays are provided in Table 13 and Table 14, respectively.

TABLE 13

dbSNP rs#	Forward PCR primer	Reverse PCR primer
523051	CTCTGCTCAGAGCATAGATG	TTCCATGCATTTTAACCCCG
693620	GTAGGTCAATAAAAGAGGAGG	TTAGGCCGAGATTTTCAGAG
2588349	GTTCAAGAGTTTGATGTCAAG	CAGGGCATCTAAATTGAACG
2588350	TGTATCTGGGACATACCATC	GTTAGTACAGGGTTGATCAC
619381	AAAGCATAGTTTCTCTTCAG	GCATCTCTAAAGGTGATTGG
3759252	GCTGTGATTTTGGTGAGTC	TATTGTTCCCAGTATTAGG
3759251	TTGTCCTTTCTCATTGCCAC	ATTAGAGCTATGGACTCACC
2418107	AGGTAAATGGGCATACAGTG	TGAAGACTGGAGCTATCTTC
7303054	AGGGAATTGGCCCAATTTCG	CCATTTACCTACTCAGCAGG
1838345	CCCAGGTTCAAGTGATTCTC	AATTAGCCAGGCATGGTTGC
620878	CCAGACCAACGTTTCAATAA	AAGAAGAAACGAATGTTTAC
2537817	GTCAGAATGCTGACATGTAG	GGGGAAAAATGAGAATAGAC
1548803	ATGGGACAATTGCAACAGG	ACTGAAATGTTCCATGTGAG
667123	TAAATACAAGAAGCCCTAGG	AGGGAAAGTACAACCTAGCC
1838346	GTTAGAAGGCTAGAGAGAAC	TTCATGAGTACTCTAGCTGG
2159903	AGTCAGGATACTCTTAGGG	GGGAAGCTTTTCTGAAGATG
3944035	GGGTCTCTATGGAACAAAAG	TGAGGGAAGCTTTTCTGAAG
3741845	TGCTTGGTGTGTCTAACTAG	CAACAGTTAACCCTGAACC
2110096	ATCAAGAACAGGATACTGCG	GGGTAGGAGATAAAGTCAGC
759055	CCCCTATCTTTTGTGGATG	GCTCTGTTTTCATGAGGTTT
589377	TTCAGTTCAGATTGCTGG	ACTCCAGTTGTAGGTAGAAG
7960194	TGCTATCTTCCATGGAAGAA	TTTTTTCCCTGTATGCCTC
7978242	GACGCTAAGCATCATTAGTC	TAGCCATTCTAGTGGATGTG
601051	TTTTTACGTCTGTGTGAACC	CACAGAAACCGAAAACCAAC
4262797	ATTTTAGTGACCCCATCACC	GTCTTTAGAGACTCAAAAGGG
2215714	GAGTTAAACATCAGTCGTTGT	TTATTATATAACGTAGGAA
1373434	CGTTTAAGATGATAGATCTTC	CTACGCAATAGGCTATTTTC
2215715	ACATGGATGGAAGGAAGAC	TATGAGCGAGAATATGTGGC
612456	TATCAACAAGCCAAGATCCC	CTTTAGCCTTTTGTGGACG
612808	GGCTGAGTGTTAAGTATTCC	AAGGCAAACCCTTAATAGGC
689118	GAAATGTTCTGTCTCAGGC	AACGTTTCTGTGAGTGCAAG
597468	TACATGTTGAGATCCCAGAC	TGCATACATTGCGAAGATT
592864	AAATTGTGTTTCTGTGAAGC	AATGAACTAAATACTCCAAG
640372	ATCTGAACTCTTTGAGCGC	TCCAAAATGTTCCAATGAGC
7866559	CCTAATTCCTTTCTATCGGTG	GAAGCTAGAAAGCTAAGAGTG
654834	CTGTCCCTTTTCTGGCTTTC	CAAACAAAATAGAGTCCAGCG
4763216	TTGTAACCATAGAAAGCAGG	TCCCTCTATTTTCTACTAC
668521	TGCTGCTGATGTAAGTGCAG	GTGCAATAGTAAGTGGCTC
669503	GTAATCCACTCATTGAGATC	TACCTAGAGGAAATAAGTGG
3906864	TTTCTAACATCCACCTTCTG	GGTGTGAATAAGTTGTAATCC
3906863	CAGGACTGACCTCTAAATAG	ACATCCACTTTCTGTAGATC
7957888	ACCTTAACAAAGTTCTGTGG	GAGCCACGAAAAAAAAAATG
9300230	CCAGACAAGCTAAATACAG	CAAATACACACAGACACATC

dbSNP rs#	Forward PCR primer	Reverse PCR primer
7306214	CTATAGCACAGTAGGGTGAC	TCTTCGTGTTGGGCACATTC
763839	TATTCATGTAACACCGAAGG	GGAACAGCAAACGTAAACAG
2418105	GGAGGCATTCCATTCTTTTC	GTGTATCCAAAGCTTTAGTG
666841	TAATCCCAAGAGAGAGGAC	AACTAACACAGATGGCCACC
3851578	GTGTGTATTTGCCCTTCTGC	GGCATGTGATAGGAATGTGC
7138797	GTTCTGAAGTACATGTGCAG	TTAATACCTAGGTGATGGGC
7295252	CAAGTTTACAATCACAGCTG	GGTAAATGTATTTGACAGTTG
2418106	CAGCCCAGAATGGCTTTGAA	ACTAACGATGGGTGATGAGC
7299578	ATCTGCCCCATGATCCAATC	CCCCTGAAAACCTCATGTTG
621112	TATGTTGGGTCACAAACCTG	AGCAAGGCGTACAAAACAAC
3863320	GTTGCTCACAATACTGGAGG	TGTCTTCAGCAGAACTCATC
1373432	TAAGGCAGAGGGCTACTTAC	GCATTTTACAAGACTTAAATCG
1047699	ATTACCAGAGTGGTTGCTCC	ATTTCTTCTGTGCAGCCTGC
1063193	AGGCTGACAGAAGGAAATCG	TCAGCAGAGACCACCAAAAC
2232959	TCAGCAGAGACCACCAAAAC	GGTGGTCGTTGCTGATTTTG
2227296	TGAGAAGAAGACACTGAAGG	ATCCCAATGATCCTCAATCC
1548804	CCCATTTTCTTCCAATCAC	GGAGCAACCAGGAGTAAATA
2232958	TCTTCTCAACCTCCTTCCTC	ATGACTCTTCTAGGGCCTCA
2232957	TTTATAAACATGAGCAGAAC	CGCATTCAACTTTATGAGAGG
2232956	GCCAATTTTGCTTACTAACC	CTAGCATTAAACCAGAGATAC
1972571	ATCACCAGCTGCCACTTTTC	CCTCAAATTATCACCAGCCC
3759250	TTCTGCCTAGGTGGCTTATG	AATCATGTCTGCATGGCAGG
3759249	CACACAGTGAATCATGTCTG	ATGGTAGACCATCAGGTAGG
1541525	TATCTGTAGACGTGCATCCC	CTGACACCTGTCCTCATAAG
2098248	GGGAGAATCATGGCTTGA	GTAATGCCCTTAGCAAATCC
2900550	TCAACAGTCTCCAGCTGATC	ACTCTGGCTGTTGTAAGGAG
7302130	TACACCTGTGAGCACTGACA	CCTTTTCTCAAGGTGTGTGC
4763583	AATGGTTTAGCACCATCCCC	GGGAGGTGACACACACTTTT
4360778	AGGCTGCAAGTTTTCCAAAC	GCCTAAGCAAAGAAATGAGC
1607695	TTCTTCTCACTGACCTATTC	ATCAAACAGAAACGCTGGAG
1607694	ATCAAACAGAAACGCTGGAG	CTCTTTTTTGTCTGACTGGG
2192139	GGTCTTTTGTTTGCTAGGAC	GTAACCTGCCAAGATTGAAC
7978300	TCTGAGTCTTTTGTGGTACC	TGCAGATTCAATGCAATCCC
7397871	AGGAGCTGAAACGATGGTTC	CAAAATGGCATGACACTGGC
4763217	ACATTGTGTCTGTGCTTCTC	GCAGTCTCTTATTGTCTGAG
2159900	TTACAACAAGTGCTCAAGGG	GTGTCTTCTCTAACAGTGAG
10772370	GAATGACCATATGATCCAGC	TAGGTATCCCTTTGATGTCC
7398682	GACAGATACCCTAACTTGATC	GCAGTAAAGCTATCAATCCTG
2900551	GTACCTCAACACAAAAGGC	GAGGAAATCTTTCACCTTTCC
2900552	GCTAGATATACTAGGCAAGAG	TGTCATCCGAAAAGATGAAC
2418214	TGTCATCCGAAAAGATGAAC	GCTAGATATACTAGGCAAGAG
2418215	CTATTCTGCAACTTTACCAG	TAGAAGGAAGTCAATTGTTC
965243	GGCTGTGTAGGTTTGTCCCTC	TTCATCCCATTCCATCCAGC
1117548	GTGGTACATCACATTAACAG	TTCTTCTTTGTGTAGTTCCG

dbSNP rs#	Forward PCR primer	Reverse PCR primer
1520225	CGTGACTCTCTGTACAGCAT	CAGCACTAGGCTGTGAAAAG
1520226	TAGGGTAAAATGTGCACAGC	GCATTGTTAGTGGTTGCTCC
1520227	TAGGGTAAAATGTGCACAGC	GCATTGTTAGTGGTTGCTCC
971919	TTAGTGACCTTCATAGAACC	CAGGCATTCTTAGAAGACAG
2159901	CATATCTACTTGTGAACCTGC	GAAGGTAAAACCACTGATGC
2159902	CCCCTATAAGAGCAAAATAC	GAACCTTTTCAGAAAGCATCAG
2110099	ATTCCTTCTCAACCCACATC	ACATTACAGGAAGGCCCTTC
7314847	CCTCTGCATAGATACAGTAG	CTCTTATACACCCTGATTGG
7296003	TGGTTACTTAGGTTGATGCC	CTACTGTATCTATGCAGAGG
4281556	GGCCTTAGGGTTTCCATAAC	AAGCCTTGGAAGAGTGAGTG
4763219	AGGAGAATCGCTTGAACCTG	TGGAGTCTCATTCTGTCACC
3851579	AGGCTTTCAAACAAAATAGG	TTACGGGTCTGATAAGAAAG
3851580	AGGCTTTCAAACAAAATAGG	TTACGGGTCTGATAAGAAAG
1049119	GATAACAGTGTTTCAAATGC	GAAATTGCAAGCTGATTGTT
2298866	TAACCAATCCCTGTCACTGG	ACAAAGATGGGCACTGCAAC
2298865	CCTGAGTTCATTTAGATCTC	ACGGAACAACCAACAATAG
2298864	CCAGTAAACACTGAAGAGATC	GATTTGTGTCTTACTCACTGG
2298863	AGCTCTTGAAGGCAATTCTG	TATGTCCTCATTGTCAACCC
3180393	AACAAGGTCCACCACCTCCT	TTGTGGCCTTCCTTGAGGAG
2070837	ACACACCCACACAACTCAC	TGGAAAGACTGCTATTCTGC
7956204	TTTGGACAATTCTTGTAGCC	TGTGAGATGTGTGAGGACAG
2418216	CCCAGGCACACATATATGAG	GCCTGAGTGTAGTGAGATTC
3741844	GCTGATTGCTCTGTGATACC	AAGTGCAGCTGGTGATTCTG
4262798	TCTAGGTACCCAAGCTCCTG	AAGAGCTGAAAGGGACACTG
2418217	GCCTGGAACACTAAAGATGG	CTCACTGACTCTCAGAGAAG
2418218	AAATTAGTCAGTCATGGTGG	TTCAAGCAATTCTCCTGCCT
7137492	TCCTCATTTACTACAGTGAC	CCCATCTCTACTAAAAATAC
2110100	CTGGAATTACAAAGAGAAGAG	CCCATCTCTACTAAAAATAC
1013312	ATTGTGTTTGCCCACTTTCC	GTGGAACATCAAGAATGAAG
4579993	ATTTGTGCTCCTTTCTACTG	AGCAGAAAGAAGGAAATGAC
1013313	TTCCAAACACAGCAAAGAGC	TTGGTTGTATTCTGGTTGGG
7397106	TCTGAAACTCAGAATGCATG	ATACTCTAAACAATACAGGG
2215716	GTA TAGCAGTAGTCAGAGG	GACACCACTACTTGACATG
2192140	CCTTGGGATTTAGAAATAGGG	GTAAGCAAATATCTCTGGAG
4763589	TTGGCAACTGTGTAACCTTG	TCAAACATACTGTTTGCTCAC
1468697	GAACACAATCGCAAGTTTAAG	GTTCTTCAAATCTGCTTCC
2070837	ACACACCCACACAACTCAC	TGGAAAGACTGCTATTCTGC
3180393	AACAAGGTCCACCACCTCCT	TTGTGGCCTTCCTTGAGGAG
2298865	CCTGAGTTCATTTAGATCTC	ACGGAACAACCAACAATAG

TABLE 14

dbSNP rs#	Extend Primer	Term Mix
523051	TCAGAGCATAGATGATGGCAA	ACT
693620	AGAGGAGGAAACCTTAATTTCT	ACT
2588349	AGAGTTTGATGTCAAGGAAATG	ACG
2588350	TACCATCAAAAGCACATCATT	ACT
619381	GAATTTTCTTCCTTTTAGAATAGA	ACG
3759252	TGGTGAGTCCATAGCTCTAAT	CGT
3759251	CCAGCTACTTTATGCCAGAG	CGT
2418107	TGGCCAGGCCAAGGATCG	ACT
7303054	CAGCCTAAATTAACCGTATGTG	ACT
1838345	CCTGCCTGAGCCTGCCAA	ACT
620878	TTCAATAATATTATAGTGAGGATG	ACT
2537817	GACATGTAGAAAAATTGCCTGC	ACT
1548803	TTGCAAACAGGTTAAAGAGAGT	ACG
667123	AAGCCCTAGGGTATTGTGATT	ACG
1838346	AAGGCTAGAGAGAACATTCCA	ACT
2159903	AGGGGTCTCTATGGAACAAA	ACT
3944035	AACAAAAGGCTTTCTTCTCTAA	ACT
3741845	CAAAGGATAAAGGGAACCATC	ACT
2110096	CAGGATACTGCGATACTGTC	ACG
759055	GTAATCTTGTTTGTTGTATTTTC	CGT
589377	CTGGTGTGTAGAAACACAACA	ACT
7960194	GCCAGGGCTCAGGGAAG	CGT
7978242	GCAAACCAAAACACAGTCAC	ACT
601051	CCCGCTTATAAGCAAGAGCA	ACG
4262797	TTATCCCTATCCTCCCTTCC	ACT
2215714	GCATCACTCTTCTACGCAATA	ACT
1373434	TGTTTCAAAACATCACTATGTAC	ACG
2215715	GGAAAGGAAGACATTATGGTAC	ACG
612456	CCAAGATCCCTGAAAGGCAA	CGT
612808	CTACTTTAGCCTTTTGTGGAC	ACT
689118	GCTTCATACACACACACAT	ACT
597468	CCCAGACTGTGTCATTCTTC	ACT
592864	GTGTTTCTTGTAAGCAGTATAC	ACT
640372	AAACTCTTGAGCGCTGACAT	ACT
7966559	TCTATCGGTGATTCTGCTGT	CGT
654834	CACAATTGGCTTTTAAACTCC	ACT
4763216	CCATAGAAAGCAGGACTGGTT	ACT
688521	AAATTAGTCTAGAACTTGTGGAA	ACT
689503	CCACTCATTGAGATCTACAGAA	ACT

dbSNP rs#	Extend Primer	Term Mix
3906864	ACATCCACCTTCTGTAGATCT	ACT
3906863	GTGTGAATAAGTTGTAATCCAC	ACG
7957888	TGTGGAAATATTTGAAGACTCTT	CGT
9300230	ATACAGAGAAGTAGAGGACAAA	CGT
7306214	CACAGTAGGGTGACTACAATTA	ACT
763839	TAACACCGAAGGTTCCCTCAG	ACT
2418105	CATTCTTTTCCAGTGTCATCAA	ACG
666841	GGACTTGGCAGCATTATTTATTA	ACG
3851578	CAGCTAATTGTGCTCCCTCA	ACT
7138797	AAGTACATGTGCAGAATGTGC	ACT
7295252	ATCACAGCTGATAATGTCATAAT	ACT
2418106	GAATGGCTTTGAATATGACCCA	ACT
7299578	CAGGTGCTATCACAAACATCG	ACT
621112	CACAAACCTGCCATTTTACTTT	ACT
3863320	AATACTGGAGGCTGGAAGAC	ACG
1373432	CAGAGGGCTACTTACAAGAATT	CGT
1047699	TCTTGCTGGTCTGTCCCTC	ACG
1063193	AGTTGACGGTGTCTCTCGT	ACG
2232959	ATCACCGCCATCCTCCCC	ACT
2227296	GAAATTCTAGTGGA AAAAG	ACT
1548804	AAAATTTCAATATGTTGCAGGCAG	ACG
2232958	CCTCCCCCTCCTGCTCTTC	ACG
2232957	GGACCTCACCACCTGAAAAG	ACT
2232956	TGCCTTACTAACCTCCAGG	ACT
1972571	CTGCCACTTTTCATTACAGGC	ACT
3759250	TAGGTGGCTTATGGTAGACC	ACT
3759249	TCTGCATGGCAGCCCCCT	ACT
1541525	CCCTCTGTGGTCTGTGCTAA	ACG
2098248	GAATCATGGCTTGACTCAGG	ACT
2900550	GCCCCCTACCACATCCCA	CGT
7302130	CCCACCCAGCAGGAAGAC	CGT
4763583	CCTGCGTACTATTCTTATGAC	ACT
4360778	TTTTACACTCTGCTTCCCTTTT	CGT
1607695	TTCTCACTGACCTATTCTATTTT	ACG
1607694	AGCTTCAAAAATAGAATAGGTCA	ACT
2192139	CTTTGATCTCATCACTTGTTATT	ACT
7978300	TTCTGTTTCTGTGAAGAATGTC	ACT
7397871	GCCAGGCTCACAGTCCAAA	CGT
4763217	TTGGACGTAGGACAAAGAACT	ACG
2159900	GCTCAAGGGAGTTCTACATCT	ACT
10772370	GACCATATGATCCAGCAATTTT	ACT
7398682	GCTTATAACAAAATATCATGTGTC	ACG
2900551	GCCATATATGACAAACCCACA	ACT

dbSNP rs#	Extend Primer	Term Mix
2900552	ATATACTAGGCAAGAGATAGAAA	ACG
2418214	CTTCCTTCTATTCAATTTCAATTT	ACT
2418215	CTATAAATAAGATCATGTCATCC	ACT
965243	CAGACCCATCAGAGAAGTAC	CGT
1117548	CCAAATAAGCATATGAATAGATG	CGT
1520225	CAGCATTGTTAGTGGTTGCTC	ACG
1520226	GCTGTGAAAAGCTATGTATGC	ACT
1520227	CAGCACTAGGCTGTGAAAAG	ACT
971919	ATAAGATAGGTCTGTTGGAAAG	CGT
2159901	TGATTTCTTCAGCCATTATCCA	ACG
2159902	TTAAGCTTGCATGAAAGAAGGT	ACT
2110099	TTATGTCAGCAGAAAAACAGAAA	ACT
7314847	GAGTTTTAGTTCTTTGAGAAATC	ACT
7296003	GGTTGATGCCATATCTTTGCT	ACT
4281556	GGTTTCCATAACAAGAATAACAAA	ACG
4763219	CCGATATCTTGCCACTGCAG	ACT
3851579	CAAAATAGGAACACACTGAGTAT	ACG
3851580	CTTTCAAACAAAATAGGAACACA	ACG
1049119	TGGCATCATGCTCTAACTTCA	ACT
2298866	CCTGTCACTGGATATTAAGGC	ACT
2298865	CATTTAGATCTCTTCAGTGTTTA	ACG
2298864	CTGAAGAGATCTAAATGAACTCA	ACT
2298863	CAATTCTGATTTTGAGAATCACT	ACT
3180393	GCCACAAGGACCACCCCA	ACT
2070837	CCACACAAACTCACATACACA	ACT
7956204	AGGCTGCCAGCACCTTTCT	ACG
2418216	GCACACATATATGAGAGAAAGG	ACT
3741844	GTGATACCTAGAAATTCCTG	ACG
4262798	CGTCTCCCTTTCACCCACC	ACG
2418217	TGCCAGGAAAGATGAACATTG	ACT
2418218	CAGTCATGGTGGCGAGGG	ACT
7137492	GCCATGTGACTTAATTTCTTTAG	ACT
2110100	TCCTCATTTACTACAGTGACC	ACG
1013312	GCCCACTTTCCCCCTTCT	ACT
4579993	ACTGTTATTTCTGGTTTCTGGT	ACT
1013313	ACAGCAAAGAGCATAAACCTAC	ACT
7397106	CTCAGAATGCATGAATAGTACA	ACG
2215716	CGTACTATTTCTTCAAGCTTCA	ACT
2192140	TAGGGTATCCCTCTTGGTCA	ACT
4763589	CTGTGTAACCTTGATCTTGGG	ACT
1468697	CAATCGCAAGTTTAAGGTAACA	ACT
2070837	CCACACAAACTCACATACACA	ACT

dbSNP rs#	Extend Primer	Term Mix
3180393	GCCACAAGGACCACCCCA	ACT
2298865	CATTTAGATCTCTTCAGTGTTTA	ACG

Genetic Analysis

[0233] Allelotyping results are shown for female cases and controls in Table 15. The allele frequency for the A2 allele is noted in the fifth and sixth columns for control pools and case pools, respectively, where “AF” is allele frequency. Some SNPs do not have an allele frequency disclosed because of failed assays.

TABLE 15: Female Allelotyping Results

dbSNP rs#	Position in SEQ ID NO:2	Chromo- some Position	A1/A2 Allele	Controls (high BMD) AF	Cases (Low BMD) AF	p-Value	OR	Low BMD Associated Allele
523051	229	10842129	T/C	T=0.00 C=1.00	T=0.00 C=1.00			
693620	368	10842268	T/C	T=1.00 C=0.00	T=1.00 C=0.00			
2588349	583	10842483	G/A	G=1.00 A=0.00	G=1.00 A=0.00			
2588350	2424	10844324	T/C	T=0.34 C=0.66	T=0.28 C=0.72	0.0295	0.76	C
619381	3625	10845525	C/T	C=0.86 T=0.14	C=0.91 T=0.09	0.0065	1.67	C
3759252	3709	10845609	C/A	C=1.00 A=0.00	C=1.00 A=0.00			
3759251	3750	10845650	T/A	T=0.01 A=0.99	T=0.01 A=0.99			
2418107	4724	10846624	G/C	G=1.00 C=0.00	G=1.00 C=0.00			
7303054	4781	10846681	T/C	T=0.00 C=1.00	T=0.00 C=1.00			
1838345	6161	10848061	A/G	A= G=	A= G=			
620878	7097	10848997	T/G	T=0.07 G=0.93	T=0.03 G=0.97	0.0098	0.37	G
2537817	8025	10849925	T/C	T=0.19 C=0.81	T=0.16 C=0.84	0.4485	0.85	C
1548803	8398	10850298	C/T	C=0.47 T=0.53	C=0.41 T=0.59	0.0564	0.78	T
667123	10144	10852044	G/A	G=1.00	G=1.00			

dbSNP rs#	Position in SEQ ID NO:2	Chromo- some Position	A1/A2 Allele	Controls (high BMD) AF	Cases (Low BMD) AF	p-Value	OR	Low BMD Associated Allele
				A=0.00	A=0.00			
1838346	10384	10852284	A/G	A=0.76 G=0.24	A=0.80 G=0.20	0.1329	1.26	A
2159903	11116	10853016	A/G	A=0.00 G=1.00	A=0.00 G=1.00			
3944035	11132	10853032	A/G	A=0.00 G=1.00	A=0.00 G=1.00			
3741845	11482	10853382	T/C	T=0.54 C=0.46	T=0.49 C=0.51	0.0877	0.81	C
2110096	14544	10856444	C/T	C=1.00 T=0.00	C=1.00 T=0.00			
759055	15688	10857588	T/A	T=0.45 A=0.55	T=0.37 A=0.63	0.0084	0.72	A
589377	17311	10859211	G/C	G=0.01 C=0.99	G=0.00 C=1.00			
7960194	17831	10859731	G/T	G=1.00 T=0.00	G=1.00 T=0.00			
7978242	20012	10861912	A/G	A=0.62 G=0.38	A=0.68 G=0.32	0.0611	1.27	A
601051	21997	10863897	G/A	G=0.01 A=0.99	G=0.00 A=1.00			
4262797	22861	10864761	A/G	A=0.61 G=0.39	A=0.54 G=0.46	0.0391	0.76	G
2215714	23470	10865370	A/G	A=0.00 G=1.00	A=0.00 G=1.00			
1373434	23515	10865415	G/A	G=1.00 A=0.00	G=1.00 A=0.00			
2215715	23863	10865763	G/A	G=1.00 A=0.00	G=1.00 A=0.00			
612456	24108	10866008	C/A	C=0.03 A=0.97	C=0.02 A=0.98			
612808	24138	10866038	T/C	T=0.20 C=0.80	T=0.11 C=0.89	0.0001	0.52	C
689118	26469	10868369	T/C	T=0.68 C=0.32	T=0.71 C=0.29	0.3485	1.15	T
597468	27769	10869669	A/G	A=0.99 G=0.01	A=1.00 G=0.00			
592864	29683	10871583	T/C	T=0.10 C=0.90	T=0.11 C=0.89	0.9292	1.04	T
640372	30491	10872391	A/C	A=0.96 C=0.04	A=0.96 C=0.04	0.6780	1.21	A
7966559	30745	10872645	A/T	A=0.79 T=0.21	A= T=			

dbSNP rs#	Position in SEQ ID NO:2	Chromo- some Position	A1/A2 Allele	Controls (high BMD) AF	Cases (Low BMD) AF	p-Value	OR	Low BMD Associated Allele
654834	31429	10873329	T/C	T=0.04	T=0.03	0.3922	0.74	C
				C=0.96	C=0.97			
4763216	31779	10873679	C/G	C=0.50	C=0.45	0.0951	0.82	G
				G=0.50	G=0.55			
668521	32194	10874094	A/C	A=0.98	A=0.99			
				C=0.02	C=0.01			
669503	32441	10874341	T/C	T=0.96	T=0.96	0.4685	1.26	T
				C=0.04	C=0.04			
3906864	32454	10874354	T/C	T=0.99	T=1.00			
				C=0.01	C=0.00			
3906863	32459	10874359	C/T	C=0.34	C=0.41	0.0288	1.35	C
				T=0.66	T=0.59			
7957888	35151	10877051	A/T	A=0.87	A=0.93	0.0155	2.12	A
				T=0.13	T=0.07			
9300230	35362	10877262	A/T	A=1.00	A=1.00			
				T=0.00	T=0.00			
7306214	35630	10877530	G/C	G=1.00	G=1.00			
				C=0.00	C=0.00			
763839	36930	10878830	G/C	G=0.82	G=0.88	0.0047	1.61	G
				C=0.18	C=0.12			
2418105	37490	10879390	G/A	G=0.21	G=0.16	0.0198	0.69	A
				A=0.79	A=0.84			
666841	38432	10880332	C/T	C=0.89	C=0.93	0.0180	1.72	C
				T=0.11	T=0.07			
3851578	38688	10880588	A/G	A=0.89	A=0.93	0.0243	1.67	A
				G=0.11	G=0.07			
7138797	39524	10881424	T/C	T=0.97	T=0.97	0.9815	0.99	T
				C=0.03	C=0.03			
7295252	41580	10883480	A/C	A=1.00	A=1.00			
				C=0.00	C=0.00			
2418106	42531	10884431	T/C	T=0.35	T=0.30	0.1784	0.80	C
				C=0.65	C=0.70			
7299578	42665	10884565	A/G	A=0.30	A=0.23	0.0036	0.67	G
				G=0.70	G=0.77			
621112	43038	10884938	A/G	A=0.87	A=0.92	0.0086	1.69	A
				G=0.13	G=0.08			
3863320	44183	10886083	G/A	G=0.52	G=0.49	0.2271	0.87	A
				A=0.48	A=0.51			
1373432	46271	10888171	A/T	A=0.00	A=0.00			
				T=1.00	T=1.00			
1047699	49075	10890975	C/T	C=0.79	C=0.85	0.0062	1.53	C
				T=0.21	T=0.15			
1063193	49147	10891047	C/T	C=0.75	C=			

P A T E N T
Docket SEQ-4095-PV

dbSNP rs#	Position in SEQ ID NO:2	Chromo- some Position	A1/A2 Allele	Controls (high BMD) AF T=0.25	Cases (Low BMD) AF T=	p-Value	OR	Low BMD Associated Allele
2232959	49180	10891080	C/G	C=1.00 G=0.00	C=1.00 G=0.00			
2227296	50301	10892201	A/G	A=0.77 G=0.23	A=0.77 G=0.23	0.9934	1.00	A
1548804	50773	10892673	G/A	G=0.24 A=0.76	G=0.15 A=0.85	0.0005	0.54	A
2232958	51243	10893143	G/A	G=1.00 A=0.00	G=1.00 A=0.00			
2232957	51530	10893430	T/C	T=1.00 C=0.00	T=1.00 C=0.00			
2232956	52107	10894007	A/G	A=0.87 G=0.13	A=0.92 G=0.08	0.0170	1.64	A
1972571	52821	10894721	A/G	A=0.13 G=0.87	A=0.13 G=0.87	0.8117	1.04	A
3759250	53341	10895241	T/C	T=0.99 C=0.01	T=1.00 C=0.00			
3759249	53376	10895276	C/G	C=1.00 G=0.00	C=1.00 G=0.00			
1541525	54047	10895947	C/T	C=0.00 T=1.00	C=0.00 T=1.00			
2098248	54392	10896292	T/C	T=0.00 C=1.00	T=0.00 C=1.00			
2900550	54482	10896382	T/A	T=0.89 A=0.11	T=0.93 A=0.07	0.0535	1.59	T
7302130	55468	10897368	C/A	C=0.36 A=0.64	C=0.36 A=0.64	0.9550	1.01	C
4763583	56990	10898890	A/G	A= G=	A= G=			
4360778	57712	10899612	A/T	A=0.00 T=1.00	A=0.01 T=0.99			
1607695	59667	10901567	C/T	C=0.00 T=1.00	C=0.01 T=0.99			
1607694	59684	10901584	T/C	T=0.81 C=0.19	T=0.83 C=0.17	0.3469	1.17	T
2192139	62043	10903943	A/C	A=0.30 C=0.70	A=0.28 C=0.72	0.4555	0.89	C
7978300	63293	10905193	T/C	T=0.36 C=0.64	T= C=			
7397871	63485	10905385	G/T	G=0.00 T=1.00	G=0.00 T=1.00			
4763217	63778	10905678	C/T	C=0.89 T=0.11	C=0.90 T=0.10	0.8698	1.05	C

dbSNP rs#	Position in SEQ ID NO:2	Chromo- some Position	A1/A2 Allele	Controls (high BMD) AF	Cases (Low BMD) AF	p-Value	OR	Low BMD Associated Allele
2159900	64222	10906122	A/G	A=0.02 G=0.98	A=0.02 G=0.98	0.1478	0.82	G
10772370	65722	10907622	A/G	A=0.31 G=0.69	A=0.27 G=0.73			
7398682	66315	10908215	C/T	C=1.00 T=0.00	C=1.00 T=0.00			
2900551	66829	10908729	A/G	A=0.00 G=1.00	A=0.01 G=0.99			
2900552	66966	10908866	C/T	C=0.61 T=0.39	C=0.59 T=0.41	0.5150	0.92	T
2418214	66971	10908871	A/C	A=0.51 C=0.49	A=0.57 C=0.43	0.0565	1.27	A
2418215	67013	10908913	T/C	T=0.82 C=0.18	T=0.86 C=0.14	0.1232	1.29	T
985243	70375	10912275	A/T	A=0.82 T=0.18	A=0.85 T=0.15	0.1637	1.25	A
1117548	74118	10916018	T/A	T=1.00 A=0.00	T=0.99 A=0.01			
1520225	75224	10917124	C/T	C=0.27 T=0.73	C=0.22 T=0.78	0.0956	0.79	T
1520226	75236	10917136	T/C	T=0.99 C=0.01	T=0.98 C=0.02			
1520227	75246	10917146	G/C	G=0.91 C=0.09	G=0.82 C=0.18	0.00001	0.46	C
971919	75812	10917712	C/A	C=0.00 A=1.00	C=0.00 A=1.00			
2159901	78968	10920868	C/T	C=0.99 T=0.01	C=0.99 T=0.01			
2159902	78998	10920898	T/C	T=0.54 C=0.46	T=0.51 C=0.49	0.3599	0.90	C
2110099	79328	10921228	A/C	A=0.60 C=0.40	A=0.63 C=0.37	0.4080	1.11	A
7314847	80922	10922822	T/C	T=0.51 C=0.49	T=0.49 C=0.51	0.6059	0.94	C
7296003	81055	10922955	T/C	T=0.63 C=0.37	T=0.65 C=0.35	0.4799	1.09	T
4281556	81412	10923312	G/A	G=0.85 A=0.15	G=0.87 A=0.13	0.5327	1.17	G
4763219	81785	10923685	A/G	A= G=	A= G=			
3851579	82079	10923979	G/A	G= A=	G=0.34 A=0.66			
3851580	82087	10923987	G/A	G=0.56	G=0.54	0.5618	0.93	A

P A T E N T
Docket **SEQ-4095-PV**

dbSNP rs#	Position In SEQ ID NO:2	Chromo- some Position	A1/A2 Allele	Controls (high BMD) AF	Cases (Low BMD) AF	p-Value	OR	Low BMD Associated Allele
				A=0.44	A=0.46			
1049119	82958	10924858	A/G	A=0.00	A=0.00			
				G=1.00	G=1.00			
2298866	83351	10925251	T/G	T=0.72	T=0.69	0.3240	0.87	G
				G=0.28	G=0.31			
2298865	83442	10925342	C/T	C=0.95	C=0.97	0.1804	1.67	C
				T=0.05	T=0.03			
2298864	83472	10925372	A/C	A=0.36	A=0.34	0.5936	0.93	C
				C=0.64	C=0.66			
2298863	83966	10925866	A/G	A=1.00	A=1.00			
				G=0.00	G=0.00			
3180393	84414	10926314	T/C	T=1.00	T=1.00			
				C=0.00	C=0.00			
2070837	86563	10928463	C/G	C=0.43	C=0.43	0.9403	0.99	C
				G=0.57	G=0.57			
7956204	86788	10928688	G/A	G=0.86	G=			
				A=0.14	A=			
2418216	86796	10928696	T/G	T=1.00	T=1.00			
				G=0.00	G=0.00			
3741844	87634	10929534	G/A	G=0.50	G=0.48	0.3827	0.90	A
				A=0.50	A=0.52			
4262798	88530	10930430	G/A	G=0.60	G=0.62	0.4130	1.10	G
				A=0.40	A=0.38			
2418217	89202	10931102	A/G	A=0.53	A=0.52	0.6562	0.95	G
				G=0.47	G=0.48			
2418218	89632	10931532	T/C	T=	T=			
				C=	C=			
7137492	89697	10931597	T/C	T=0.75	T=0.76	0.7043	1.07	T
				C=0.25	C=0.24			
2110100	89723	10931623	G/A	G=0.53	G=0.52	0.5403	0.93	A
				A=0.47	A=0.48			
1013312	91063	10932963	C/G	C=0.29	C=0.26	0.1928	0.84	G
				G=0.71	G=0.74			
4579993	91335	10933235	C/G	C=0.00	C=0.00			
				G=1.00	G=1.00			
1013313	91504	10933404	T/C	T=0.61	T=0.58	0.3893	0.90	C
				C=0.39	C=0.42			
7397106	91619	10933519	C/T	C=0.02	C=0.04			
				T=0.98	T=0.96			
2215716	93715	10935615	A/G	A=0.45	A=0.36	0.0372	0.69	G
				G=0.55	G=0.64			
2192140	93945	10935845	T/C	T=0.00	T=0.00			
				C=1.00	C=1.00			

dbSNP rs#	Position in SEQ ID NO:2	Chromo- some Position	A1/A2 Allele	Controls (high BMD) AF	Cases (Low BMD) AF	p-Value	OR	Low BMD Associated Allele
4763589	94235	10936135	T/C	T=0.53	T=0.52	0.6806	0.95	C
				C=0.47	C=0.48			
1468697	95851	10937751	T/C	T=0.02	T=0.01			
				C=0.98	C=0.99			
2070837	130860	10972760	C/G	C=0.43	C=0.43	0.9403	0.99	C
				G=0.57	G=0.57			
3180393	132815	10974715	T/C	T=1.00	T=1.00			
				C=0.00	C=0.00			
2298865	133778	10975678	C/T	C=0.95	C=0.97	0.1804	1.67	C
				T=0.05	T=0.03			

[0234] Allelotyping results were considered particularly significant with a calculated p-value of less than or equal to 0.05 for allelotype results. These values are indicated in bold. The allelotyping p-values were plotted in Figure 2. The position of each SNP on the chromosome is presented on the x-axis. The y-axis gives the negative logarithm (base 10) of the p-value comparing the estimated allele in the case group to that of the control group. The minor allele frequency of the control group for each SNP designated by an X or other symbol on the graphs in Figure 2 can be determined by consulting Table 15. For example, the left-most X on the left graph is at position 10842129. By proceeding down the Table from top to bottom and across the graphs from left to right the allele frequency associated with each symbol shown can be determined.

[0235] To aid the interpretation, multiple lines have been added to the graph. The broken horizontal lines are drawn at two common significance levels, 0.05 and 0.01. The vertical broken lines are drawn every 20kb to assist in the interpretation of distances between SNPs. Two other lines are drawn to expose linear trends in the association of SNPs to the disease. The light gray line (or generally bottom-most curve) is a nonlinear smoother through the data points on the graph using a local polynomial regression method (W.S. Cleveland, E. Grosse and W.M. Shyu (1992) Local regression models. Chapter 8 of Statistical Models in S eds J.M. Chambers and T.J. Hastie, Wadsworth & Brooks/Cole.). The black line provides a local test for excess statistical significance to identify regions of association. This was created by use of a 10kb sliding window with 1kb step sizes. Within each window, a chi-square goodness of fit test was applied to compare the proportion of SNPs that were significant at a test wise level of 0.01, to the proportion that would be expected by chance alone (0.05 for the methods used here). Resulting p-values that were less than 10^{-8} were truncated at that value.

[0236] Finally, the exons and introns of the genes in the covered region are plotted below each graph at the appropriate chromosomal positions. The gene boundary is indicated by the broken horizontal line.

The exon positions are shown as thick, unbroken bars. An arrow is place at the 3' end of each gene to show the direction of transcription.

Example 5

GRID2 Proximal SNPs

[0237] It has been discovered that a polymorphic variation (rs1948017) in a gene encoding *GRID2* is associated with the occurrence of low BMD (see Examples 1 and 2). One hundred five additional allelic variants proximal to rs1948017 were identified and subsequently allelotyped in low BMD case and high BMD control sample sets as described in Examples 1 and 2. The polymorphic variants are set forth in Table 16. The chromosome position provided in column four of Table 16 is based on Genome "Build 34" of NCBI's GenBank.

TABLE 16

dbSNP	Position in SEQ ID NO:3	Chromosome	Chromosome Position	Alleles (A1/A2)	genome_letter	deduced_iupac
1433661	206	4	94744308	t/c	g	R
1485009	243	4	94744343	a/g	g	R
7681947	2467	4	94746567	t/c	t	Y
1816432	3550	4	94747650	a/g	t	Y
1485018	4994	4	94749094	c/g	g	S
1485017	5167	4	94749267	g/t	c	M
7438397	5193	4	94749293	c/t	c	Y
6834311	5273	4	94749373	g/a	g	R
1368717	5733	4	94749833	a/g	c	Y
1017391	7817	4	94751917	a/c	g	K
2870701	7818	4	94751918	t/a	a	W
7679839	8612	4	94752712	t/g	t	K
1385404	9158	4	94753258	a/g	a	R
1368716	9285	4	94753385	g/a	c	Y
4693316	10680	4	94754780	g/a	a	R
1905707	11866	4	94755966	t/c	c	Y
1905708	11958	4	94756058	a/g	a	R
1905709	12044	4	94756144	a/t	t	W
3912442	12753	4	94756853	g/t	t	K
2082553	15585	4	94759685	a/g	c	Y
6831638	17299	4	94761399	c/t	c	Y
5860329	18816	4	94762916	-g	g	N
2870702	24022	4	94768122	c/t	t	Y
2870703	24994	4	94769094	c/t	t	Y
1948016	26637	4	94770737	g/t	t	K
6835836	27635	4	94771735	c/g	g	S
1994253	28773	4	94772873	t/c	t	Y

P A T E N T
Docket SEQ-4095-PV

dbSNP	Position in SEQ ID NO:3	Chromosome	Chromosome Position	Alleles (A1/A2)	genome_letter	deduced_iupac
1905710	29430	4	94773530	a/t	a	W
1485019	29876	4	94773976	t/a	t	W
978191	30364	4	94774464	c/t	a	R
1385405	31057	4	94775157	c/a	t	K
7694381	31782	4	94775882	c/t	t	Y
1905711	33400	4	94777500	a/c	c	M
1905734	35588	4	94779688	a/c	t	K
1485012	37663	4	94781763	c/g	c	S
1485013	37865	4	94781965	t/c	c	Y
4692981	38218	4	94782318	a/t	a	W
7670552	39375	4	94783475	t/c	c	Y
7670932	39559	4	94783659	c/t	c	Y
7688091	39833	4	94783933	a/g	g	R
7440540	40135	4	94784235	a/g	g	R
2171000	41698	4	94785798	g/a	t	Y
2870704	42249	4	94786349	t/c	t	Y
7655758	42571	4	94786671	g/c	c	S
7661436	42977	4	94787077	g/a	g	R
7662289	43548	4	94787648	t/c	c	Y
7667044	43631	4	94787731	g/a	a	R
7691929	43705	4	94787805	t/c	t	Y
5860330	43817	4	94787917	t/t/-	t-	N
901013	44374	4	94788474	a/c	g	K
901012	44464	4	94788564	a/c	g	K
901011	44788	4	94788888	t/c	g	R
1948018	48962	4	94793062	a/g	c	Y
2870705	48993	4	94793093	t/g	t	K
1948017	49110	4	94793210	c/t	a	R
1905733	49434	4	94793534	c/t	a	R
1385408	49523	4	94793623	t/g	t	K
1385409	49742	4	94793842	c/g	c	S
1385410	49907	4	94794007	g/c	g	S
1485026	50028	4	94794128	g/c	g	S
1485027	50089	4	94794189	g/t	t	K
2904483	51588	4	94795688	c/a	a	M
1385406	52899	4	94796999	c/a	a	M
1905732	54088	4	94798188	a/c	t	K
2046418	56538	4	94800638	c/t	a	R
2200377	59071	4	94803171	t/c	g	R
1905731	59110	4	94803210	a/c	t	K
1905730	59178	4	94803278	a/g	c	Y
975713	61087	4	94805187	t/c	a	R
6820985	61300	4	94805400	c/g	c	S

P A T E N T
Docket SEQ-4095-PV

dbSNP	Position in SEQ ID NO:3	Chromosome	Chromosome Position	Alleles (A1/A2)	genome_letter	deduced_iupac
7670441	62171	4	94806271	t/c	c	Y
6810794	62783	4	94806883	t/a	t	W
7676623	62983	4	94807083	t/c	c	Y
1154861	63908	4	94808008	c/t	t	Y
1032125	64088	4	94808188	g/t	g	K
1485022	64941	4	94809041	a/t	a	W
1485024	65050	4	94809150	a/g	g	R
3913651	68953	4	94813053	c/t	c	Y
4693319	70093	4	94814193	t/c	c	Y
1872383	71308	4	94815408	c/a	g	K
2200376	73009	4	94817109	t/a	t	W
7668090	74002	4	94818102	a/g	g	R
7692930	74294	4	94818394	t/c	t	Y
967096	74879	4	94818979	g/c	g	S
6822249	76936	4	94821036	g/t	t	K
6532405	77195	4	94821295	g/a	g	R
1017897	77683	4	94821783	t/c	c	Y
7672674	78283	4	94822383	t/c	t	Y
7694568	78331	4	94822431	c/t	c	Y
2904484	79362	4	94823462	g/c	c	S
7340830	80357	4	94824457	c/t	c	Y
1485033	80653	4	94824753	t/c	g	R
2870706	80840	4	94824940	a/g	g	R
1905729	83203	4	94827303	a/g	c	Y
4693320	85405	4	94829505	t/c	t	Y
6848749	86441	4	94830541	g/t	t	K
6532406	86967	4	94831087	g/a	g	R
6532407	87121	4	94831221	t/c	t	Y
1905728	89617	4	94833717	t/c	g	R
6819866	90969	4	94835069	t/a	a	W
1905727	94249	4	94838349	g/c	g	S
7674069	95811	4	94839911	t/g	t	K
1905724	96690	4	94840790	t/g	c	M
1905723	96731	4	94840831	a/g	c	Y
1485020	97267	4	94841367	c/g	c	S
6814101	97414	4	94841514	t/g	g	K

Assay for Verifying and Allelotyping SNPs

[0238] The methods used to verify and allelotype the proximal SNPs of Table 16 are the same methods described in Examples 1 and 2 herein. The primers and probes used in these assays are provided in Table 17 and Table 18, respectively.

TABLE 17

DbSNP rs#	Forward PCR primer	Reverse PCR primer
1433661	CTCCCAAAGCCATGGGATTC	CAGGAATGCAATCTAAGGCC
1485009	CCTAACCTCTTCTGGAAAA	GACCTATAAAGACAGGAATGC
7681947	ACCAGAACAGGACGAATTAG	CCCCAATGTTATGCATACTC
1816432	GTTCTAGCCTTACTGAGATAG	GCTTAAAGACCTTCAAACCTAC
1485018	AAAGATCGCTTGAACTGGG	TTGCTCTGTTGTCAAGGCTG
1485017	TGACCAGGCTGGTCTAAAAC	TAATCCAGCAGTTTGGGAG
7438397	GAGATCTAGCAATCCTCTG	GAAACCTAATTTTGAGCCTG
6834311	TCATTGTGTTACAGATGCTC	CCAGGCTCAAAATTAGTTTC
1368717	AAATCTGCAGACAAGGACAG	AGCAACCTGGTTTTAAGAGC
1017391	ATGCACAAATGACAGTAGGG	GGACATTGTAGTAGTCAGGG
2870701	ATGCACAAATGACAGTAGGG	GGACATTGTAGTAGTCAGGG
7679839	CCACAGGAACTATTTGCTGG	GGAACAGCACAAGCAAAAAC
1385404	CCCAGCATCCTTGCTAATAC	CCTGTCAAGATGCATAGGAG
1368716	TGGGAGAACTGGGAAAATGG	TGCTACATACTGTAGCAGCC
4693316	ATCCTGTACTGCACTTCAGC	ACCCTCCATGGGAGTTTTTC
1905707	TTTTCTGTAGTTTCCCGAGC	AATGCAATCCACAGAGCAAG
1905708	GGAACAAATGAAGATAGATG	GGACCTATGTTTTATGAGTTC
1905709	TAGAATAGTTTCTCAGTGTC	GAATCATAAAACATAGGTCC
3912442	CATAACTCAGGCAAAACAAC	GTTGAAAAAGCTCTATATTGG
2082553	TGGAGCCCACTCAGATATTC	CCCTGGAACATGTAAATGTG
6831638	CCATATACTTACCTTTACTG	AATGTGAGTTCTGAAGATGG
5860329	CCATGCTGGCTTTTGTGAAC	TCCTGACCCTTAGTCCAATG
2870702	CAAAGAATGAGAGGGAAGGC	TGTGGCCTACCAGAATTTGC
2870703	AATAAGAGGACAGCAGGAG	CACAGTTGTACTCCTAGCTC
1948016	GAATGAATGCAGTGTGCCAG	TGAACCTATCTTGCAGGTGG
6835836	TTATTTAGGAAGCACTCAGC	GAGTCCAAGACTAGTAAAGAG
1994253	TTACCTTTCTGTGTTCTCC	AAGAAGAAGAACAACCTGTAC
1905710	CATTAAGTGAAGAGCTATTCC	CTTAAAAGCTATTTCGTTAAGC
1485019	TTTAAGCTCCCCAAAAGGTG	TACTGTGACATTCCCTTCTC
978191	AGGTCTTATCTCTTGAATG	CCCATTCAAGATATATAGACAG
1385405	CATTCAGACCTGTGACAGGA	TGATGGGACTGTTCTTCAGG
7694381	CTAGTGATTCTGTGAATGTTG	CAATGTGATTGTGTTGGAAG
1905711	CAGTTAACACTCCATATCCAC	GAGCCTCAGTTTGTTGAATC
1905734	AATTTCAAGATCAGAGATCC	CCTAACATGAGTCCATTCTG
1485012	ATACACCTATGCTAAGAAGC	GCAGAAAACTAGTACGATAC
1485013	ACACATCATAGTTTACTGC	GGATGAACTATGTGAAAGC
4692981	GCTAGCCTGGAATCAAACAC	CCGAAAACAAAAGCACCCCTG

DbSNP rs#	Forward PCR primer	Reverse PCR primer
7670552	TTTGGCTGCAATCAACCATG	ATCCCAAGAGAAATGAAAAC
7670932	CCTTGAAAGCATGCTAAGGG	TGAGTCCCTATAGATTTGTC
7688091	TGGATTGTGCACTTTGGATG	ACCAGACTCTCTCTTTTTTA
7440540	TGCACAGACTGTTAAGGGAG	TCATCCTTTAAGCCTTGCCG
2171000	TGAGCCAAGTATGAAAAAC	CTGGGATAATTGTTGGGATC
2870704	ATGCTCTTGGAGCTCAGAAG	ACATATTTCCCTGACCTCCC
7655758	GTCAAAACCTCTTACTGTGC	CATGGCAGCCTTACCAAAGA
7661436	ACTGAAATTCCTTGCTGAAC	TCTCCAGGTAAACTTCCAAG
7662289	AAAACAGTGAAAGACCTTGC	TATTGAGGCCGAGTAGTCTG
7667044	ACTGATAAAACAAAGGAGGG	GAAAGCAAGGTCTTTCCTG
7691929	TTTCTCAGCATATGTTCCAG	ATCAGTCTCAGGGAAGATGC
5860330	CTGCCTAGATGAAACAAATG	CTGCTGGAACATATGCTGAG
901013	AAGGTGCATCCCTCAGAAAG	GCCTGGCTGATCTAAGGTTT
901012	CTGAAATAGTGAGGGTAGTG	AAGATGTGGAGAGAACAAGG
901011	AAAAGGGAAGGGAAGTGTGG	ACTCTCCTCCAAGAGCTTTC
1948018	TTTATCAGCAAGCATGTGAG	GTTTTCTGGAAAACCTTTACC
2870705	TAGTGCATGAGAAAGTCTAC	TTGCTTATCTGACTGGCAAG
1948017	GTTTAACAGCAACCATTGAGG	CCCCAAAGGTATGTTAAGAG
1905733	TGGAAGAGTATTAACCTCTG	TTAGTCTATTGATTGAAAGC
1385408	ACTCTTCCAAAGACTGATGC	GGATGTGGGGTTATAAGAAC
1385409	TTGCCTCTTCCAGTCTATTG	CAGAGGAGAGACATGATCAG
1385410	AGAGACAGAAGAGACACTAG	CCCCATCCAAATACATTGCC
1485026	GAGAAGAAGGCATATGTGAG	CTCACTCTTTCTTCTGTCTG
1485027	TGGTGATGATAGGTGCTGTG	ACACAGGTGCTTTCTAATTG
2904483	CTTCTCTCCATGAAACTCAG	AGGAGATATCAAGACACCAG
1385406	CTCCATTATCTGTTTGCAGT	CTCTGAGTAGTGTTTCTGG
1905732	CTGTTCTTGTGTTTCTTCTGC	GTGGTGTTTGCCATTAAAAG
2046418	AGGAGAGAAGTCTATGTCCC	TTCTTACATTCTAGAGCCTT
2200377	GGATGGACTATTGTTTCTT	CCTATCTTGATTAGATTACAG
1905731	TCACTGCTTAGAAACTAATC	AAACACCTTTCTGAGAATTG
1905730	AAACTGAAGCAGATTCTGAC	CTTTGTTCTTTCAATTCTCAG
975713	GCTAATTTTCTAGGATCTC	AGTGAGCCCCAAAATCTGTG
6820985	CTAAGCCTAATAAAGGAGGG	ATATATAGAAAAGACTGGAG
7670441	CAATAATGACATGCTCTTAC	CGTATAGCAATCATAACAAG
6810794	ATGATGGAGCTCCAGAAAAG	CAGAGATATTTAGTGGCAAC
7676623	TTCAGAGCTCACTTTCCAAC	GGGGCTACCAAACCTTAAAAG
1154861	GACACTGAATCCATAGATCG	CCTTTTTAAATAACCAGTGAC
1032125	CCTCATGCTTTAATAGGTAG	CACACATTTCTATAGTACTTG
1485022	AAATTAGGCTGAAGGAACAG	GCTTGATGGTTATTACAATGG
1485024	CGTTTCCACCACCTGGAAAT	CTGGCTTTCTTCCATTGTTG
3913651	CCTTGAGTATCTAAGAAAGGC	AAAATATACTTGTTTGTGAGC
4693319	TCAAGAGTGGAAGGGAGAG	CAGCTCCACTCACTATCTTG
1872383	TGGCCTCAAATGCATGTGTC	CTTTGGAGCTATCCAAATGG
2200376	GTGTTTGAGAAAGAAGTGTG	GAGTTCAGACAGAGTATGAG

DbSNP rs#	Forward PCR primer	Reverse PCR primer
7688090	GTAGGCCTGAGAATGCATTG	GACATTCCATTATTCCCTCCC
7692930	ATGAGAACACATGGACACGG	TCTCCTAATGCTATCCCTCC
967096	GATTGGAAAAGGGCAACAGG	TCCATGAGAATGTTCCCTCAG
6822249	AAAGGATGTTTCCATTTCTC	CCTAGAAAGGTAGTTGATGC
6532405	CTCAGGATCATTGAGACTTAG	CTTGAAAGATAACTGCGGAC
1017897	TGCCCAAACCTGCAAATACAC	GCTACATTAAGTGAATTCTAC
7672674	CTACAACAGACAAGGATGGG	CAATGCCTTCAGCATTTTCC
7694568	CCATTTCTAATGGGTACCTC	TGCCATACACTACAACAGAC
2904484	ATTTTCACATTGCTTTGCCC	GAACAAGCAGAGCAAGTAAG
7340830	CAATCTCAAAACAGTGTTTAC	ACTAAGAAAGGAGAGAACAG
1485033	CTGGCTGGAATGTTAATAGG	TGTGCTCCTCAGTACATAGC
2870706	CCTGCAGGAAGAAAATAGGC	AGGGAAGCAAACTAAGATG
1905729	GGGAATTACTCTAGCTCTTC	AGGAAAGAGTAGGCCAAATG
4693320	TCAAAC TAGTAGCCACAAA	GTATAGATTACAGTAGATGTG
6848749	CCATCTTTTGTCTGCATTG	CAGTCAATTTTCATATTGCC
6532408	GCATGGCTCTTAGGAGAAAAG	GCTGGAAGGGAAAATGGTAC
6532407	TTGTTTTCTAGGCTCCAGC	TGGCTACAATAGGGAGACTG
1905728	GCAAGTTCATTTTCATATAGCG	TAAAACAGTGTGAAATTTTG
6819866	CACACATAGCTCTTCTGTAAG	GCCTCGAGGAAAAAAAATAG
1905727	AAGGGATAACAAGACAAATG	ACCCCATGATCTACTATTTTC
7674069	CAGTTACTCCAACTTACGG	GGTAACAAAGGCACTCAAGG
1905724	GCTCTCAGTGTCTTTTAATG	CGCATATGATTAGCTACTTC
1905723	GGGTTTATAAGCCTTTTCTTC	CTTGCTAACAATGAAAAGGTG
1485020	GTTGTCATTTTATGTCTCCG	TAGAGTCACTGCCAATAAAC
6814101	GAGGACTTCAATGACTTTGC	TCAGACACAAACATCTGAAG

TABLE 18

dbSNP rs#	Extend Primer	Term Mix
1433661	CATGGGATTCCAGGTGT	ACT
1485009	CCTCTTCTGGAAAATCTTAA	ACT
7681947	ACGAATTAGTCCAAGGA	ACT
1816432	TGAGATAGTTAATTTGTTTTCCA	ACT
1485018	CAGTGAGCCATGACTGT	ACT
1485017	GGTCTAAACTCCTGAGAT	CGT
7438397	CTCCTGCCTTGGCCTCC	ACG
6834311	GAAGAGAAAGAGATGGC	ACG
1368717	AGGGATCGGAAATTTAAGAAGAA	ACT
1017391	AATGACAGTAGGGATTATAGTAA	ACT
2870701	GACAGTAGGGATTATAGTAAG	CGT
7679839	ATTTGCTGGCCCTTTAA	ACT
1385404	CCTAAAGCAGCCACTGT	ACT
1368716	CAATGAGAAATGCCAGC	ACG

dbSNP rs#	Extend Primer	Term Mix
4693316	GCGATAGAGTGAGATTCTG	ACG
1905707	TGTAGTTTCCCGAGCTAGATT	ACT
1905708	AGATAGATGAATGGAGAACCC	ACT
1905709	GTTTCTCAGTGCATCAAATA	CGT
3912442	AAAAAGACATATCTTCTTTTAGTG	CGT
2082553	CCACTCAGATATTCCATAAC	ACT
6831638	CCTTTACTGTGATATTTATTTCTT	ACG
5860329	GCTCCTGAAACATATTCATG	ACT
2870702	GAAGGCATTATGACATGAAT	ACG
2870703	TTGTTTATTCAAATCTGCCA	ACG
1948016	GCCAGTAATCTCTCCAATGAT	CGT
6835836	CACTCAGCTGAATAGACA	ACT
1994253	CTGACTCATACATCCTTTG	ACT
1905710	GAGCTATTCCAATGTGCT	CGT
1485019	AAGCTCCCCAAAAGGTGTTTAATT	CGT
978191	TGTACAAATCTGAGGGC	ACG
1385405	CCTGTGACAGGATTCCAGCA	CGT
7694381	GGATTACAGTAGTTTCCC	ACG
1905711	CCATATCCACAGGTTCT	ACT
1905734	CTTAGCCACTCTGATAATCT	ACT
1485012	ACACTGCAAAAAGCACT	ACT
1485013	TGCAGAGATAATGTATGTAGAA	ACT
4692981	TCAAACACAGTTTATATGAGATAA	CGT
7670552	CAACCATGCTGCTATGA	ACT
7670932	CATGCTAAGGGAAAGAAG	ACG
7688091	GGATGGGTGAATTGTATATTAT	ACT
7440540	TTAAGGGAGAGCATGAAA	ACT
2171000	GGTAGAAATGGACTTTGA	ACG
2870704	GCAGCTTCCTAACAAAAA	ACT
7655758	GCCTTTGAAAGAATCCAA	ACT
7661436	CTTTTTTGTTTCTATCCAGG	ACG
7662289	TGCTTCTTTATTCCCCA	ACT
7667044	GCTTTGTTTTTGATGAGTG	ACG
7691929	TTAATTCTGAGACGTGT	ACT
5860330	CTTGCAAGTGATTAAAAAAAAA	ACT
901013	GAAAGCATTCTCTCACTA	ACT
901012	GTAGTGTCTACAAAGGGTATA	ACT
901011	GTTGATCTCCTTCCTGG	ACT
1948018	GAGAAAGTAGACTTTCTCAT	ACT
2870705	CTTCTCACATGCTTGC	ACT
1948017	CAGCAACCATTGAGGGTGAAT	ACG
1905733	TGTCCTTGACTGATTTTAG	ACG
1385408	TCTAGGAAGTATGAGATGG	ACT

dbSNP rs#	Extend Primer	Term Mix
1385409	CAATAGTAACTGTCAACTGT	ACT
1385410	CAAGGAAGCTAGAGCCA	ACT
1485026	CTTCAATTAGAAAGCACCT	ACT
1485027	GTGCTGTGAAGAGAAATTA	CGT
2904483	GGATTGTTTCTTCCTCT	CGT
1385408	TGTATACAGAAAAAGCATGA	CGT
1905732	GTTGGTGCAAAAGTAACT	ACT
2046418	GTCTATGTCCCTGACAC	ACG
2200377	AAAAATTAAACATTCACTGCTTA	ACT
1905731	TTCTGTAATCTAATCAAGATAGG	ACT
1905730	TCTGACAGGACTAAAGAA	ACT
975713	GGTCAGCTAAGGATTTTAGA	ACT
6820985	AAAGGAGGGCTCTACCC	ACT
7670441	CATGCTCTTACATGCAAATA	ACT
6810794	CCAGAAAAGCAAGCTTATTA	CGT
7676623	TCTTCTTTAATGTGATGGTAC	ACT
1154861	GAATCCATAGATCGTATACTAAT	ACG
1032125	ATTTATATTCCGCCCA	CGT
1485022	TCCAAAACGACCAGTCA	CGT
1485024	TTCATGCTAACTGATTATCAAAT	ACT
3913651	GGCAAAATTCCATGGCC	ACG
4693319	GAGTAATTGGACCTCTAC	ACT
1872383	CCATTCCATATCCTTACC	CGT
2200376	TTTTACATCTCACCCCA	CGT
7668090	GAATGCATTGGAGTGAG	ACT
7692930	ATCACACTCCGGGGACT	ACT
967096	AGGGCAACAGGGACACA	ACT
6822249	GTATTCACCATTGCAAAAA	CGT
8532405	GAACAACCTGAAATCTGAAGTA	ACG
1017897	AACTGCAAATACACATTTCA	ACT
7672674	GTTTTGAACACTTAATGTTTG	ACT
7694568	GATTTCACCCCTTTCCC	ACG
2904484	AAATGTTCTCCAAGAAAGAT	ACT
7340830	GTTTACATATGAGGAAATGTAG	ACG
1485033	GCCCTCTAAAGACATGA	ACT
2870706	GAAGAAAAATAGGCTGATTTTAT	ACT
1905729	CTAGCTCTTCAGAATTAATTGG	ACT
4693320	CCCACAAAGTCTTATGCA	ACT
6848749	CCAACAGAGAGAGGTATTTA	CGT
8532406	CATGGTCTACACACCTTTA	ACG
8532407	CCTTGTAAAGACTACCTGAA	ACT
1905728	CAGTTAATAATTGTAGATCCATG	ACT
6819866	GCTCTTCTGTAAGAAGTCT	CGT

dbSNP rs#	Extend Primer	Term Mix
1905727	ATGATTGTAGATCATTGATGTA	ACT
7674069	TTCCTAACTCTTCACCTT	ACT
1905724	CATTGTTAGCAAGTGGAA	ACT
1905723	GAGCATAAAGATGCTCTCAGT	ACT
1485020	CTCCGTTATCTCCATGT	ACT
6814101	GCAAATGTAGTTGTATGTAATT	ACT

Genetic Analysis

[0239] Allelotyping results are shown for female cases and controls in Table 19. The allele frequency for the A2 allele is noted in the fifth and sixth columns for control pools and case pools, respectively, where “AF” is allele frequency. Some SNPs do not have an allele frequency disclosed because of failed assays.

TABLE 19

dbSNP rs#	Position in SEQ ID NO:3	Chromo- some Position	A1/A2 Allele	Control AF (High BMD)	Case AF (Low BMD)	p-Value	OR	Low BMD Associated Allele
1433661	206	94744306	T/C	T=0.11 C=0.89	T=0.17 C=0.83	0.0089	1.64	T
1485009	243	94744343	A/G	A=0.00 G=1.00	A=0.00 G=1.00			
7681947	2467	94746567	T/C	T= C=	T=0.89 C=0.11			
1816432	3550	94747650	A/G	A=0.56 G=0.44	A=0.61 G=0.39	0.0779	1.23	A
1485018	4994	94749094	C/G	C=1.00 G=0.00	C=0.89 G=0.01			
1485017	5167	94749267	G/T	G= T=	G= T=			
7438397	5193	94749293	C/T	C=0.94 T=0.06	C=0.94 T=0.06	0.8804	0.96	C
6834311	5273	94749373	G/A	G=0.51 A=0.49	G=0.56 A=0.44	0.1212	1.20	G
1368717	5733	94749833	A/G	A=0.10 G=0.90	A=0.13 G=0.87	0.1573	1.31	A
1017391	7817	94751917	A/C	A=0.64 C=0.36	A=0.63 C=0.37	0.6402	0.94	C
2870701	7818	94751918	T/A	T=0.00 A=1.00	T=0.00 A=1.00			
7679839	8612	94752712	T/G	T=0.97 G=0.03	T=0.90 G=0.10	0.0000	0.31	G

dbSNP rs#	Position in SEQ ID NO:3	Chromo- some Position	A1/A2 Allele	Control AF (High BMD)	Case AF (Low BMD)	p-Value	OR	Low BMD Associated Allele
1385404	9158	94753258	A/G	A= G=	A=1.00 G=0.00			
1388716	9285	94753385	G/A	G=0.89 A=0.11	G=0.83 A=0.17	0.0251	0.62	A
4693316	10680	94754780	G/A	G=0.57 A=0.43	G=0.53 A=0.47	0.2431	0.87	A
1905707	11866	94755966	T/C	T=0.07 C=0.93	T=0.13 C=0.87	0.0008	1.99	T
1905708	11958	94756058	A/G	A=0.97 G=0.03	A=0.92 G=0.08	0.0003	0.35	G
1905709	12044	94756144	A/T	A=0.05 T=0.95	A=0.06 T=0.94	0.8882	1.08	A
3912442	12753	94756853	G/T	G=0.00 T=1.00	G=0.00 T=1.00			
2082553	15585	94759685	A/G	A=0.00 G=1.00	A=0.11 G=0.89			
6831638	17299	94761399	C/T	C=1.00 T=0.00	C=1.00 T=0.00			
5860329	18816	94762916	-/G	-=0.00 G=1.00	-=0.00 G=1.00			
2870702	24022	94768122	C/T	C=0.86 T=0.34	C=0.65 T=0.35	0.8596	0.98	T
2870703	24994	94769094	C/T	C=0.63 T=0.37	C=0.62 T=0.38	0.7613	0.96	T
1948016	26637	94770737	G/T	G=0.52 T=0.48	G=0.47 T=0.53	0.1367	0.84	T
6835836	27635	94771735	C/G	C=0.00 G=1.00	C=0.00 G=1.00			
1994253	28773	94772873	T/C	T=0.92 C=0.08	T=0.87 C=0.13	0.0134	0.61	C
1905710	29430	94773530	A/T	A=0.39 T=0.61	A=0.34 T=0.66	0.2784	0.83	T
1485019	29876	94773976	T/A	T=0.14 A=0.86	T=0.19 A=0.81	0.0338	1.42	T
978191	30364	94774464	C/T	C=0.00 T=1.00	C=0.00 T=1.00			
1385405	31057	94775157	C/A	C=0.68 A=0.32	C=0.66 A=0.34	0.6519	0.94	A
7694381	31782	94775882	C/T	C=0.21 T=0.79	C=0.24 T=0.76	0.1629	1.22	C
1905711	33400	94777500	A/C	A=0.00 C=1.00	A=0.00 C=1.00			

dbSNP rs#	Position in SEQ ID NO:3	Chromo- some Position	A1/A2 Allele	Control AF (High BMD)	Case AF (Low BMD)	p-Value	OR	Low BMD Associated Allele
1905734	35588	94779688	A/C	A=0.92 C=0.08	A=0.88 C=0.12	0.0229	0.61	C
1485012	37663	94781763	C/G	C=0.96 G=0.04	C=0.91 G=0.09	0.0032	0.47	G
1485013	37865	94781965	T/C	T=0.00 C=1.00	T=0.00 C=1.00			
4692981	38218	94782318	A/T	A=0.68 T=0.32	A=0.72 T=0.28	0.1741	1.19	A
7670552	39375	94783475	T/C	T=0.11 C=0.89	T=0.22 C=0.78	0.0000	2.26	T
7670932	39559	94783659	C/T	C=1.00 T=0.00	C=1.00 T=0.00			
7688091	39833	94783933	A/G	A=0.00 G=1.00	A=0.13 G=0.87			
7440540	40135	94784235	A/G	A=0.00 G=1.00	A=0.00 G=1.00			
2171000	41698	94785798	G/A	G=0.00 A=1.00	G=0.00 A=1.00			
2870704	42249	94786349	T/C	T=0.53 C=0.47	T=0.53 C=0.47	0.8418	1.02	T
7655758	42571	94786671	G/C	G=0.21 C=0.79	G=0.25 C=0.75	0.0531	1.32	G
7661436	42977	94787077	G/A	G=0.44 A=0.56	G=0.45 A=0.55	0.7243	1.04	G
7662289	43548	94787648	T/C	T=0.24 C=0.76	T=0.29 C=0.71	0.1625	1.27	T
7667044	43631	94787731	G/A	G=0.18 A=0.82	G=0.22 A=0.78	0.0669	1.31	G
7691929	43705	94787805	T/C	T=0.93 C=0.07	T=0.90 C=0.10	0.0439	0.64	C
5860330	43817	94787917	T/-	T=0.48 - =0.52	T=0.52 - =0.48	0.1449	1.19	T
901013	44374	94788474	A/C	A=0.00 C=1.00	A=0.00 C=1.00			
901012	44464	94788564	A/C	A=0.00 C=1.00	A=0.00 C=1.00			
901011	44788	94788888	T/C	T=1.00 C=0.00	T=1.00 C=0.00			
1948018	48962	94793062	A/G	A=0.10 G=0.90	A=0.19 G=0.81	0.0002	2.20	A
2870705	48993	94793093	T/G	T=1.00 G=0.00	T=1.00 G=0.00			
1948017	49110	94793210	C/T	C=0.12	C=0.17	0.0068	1.60	C

P A T E N T
Docket SEQ-4095-PV

dbSNP rs#	Position in SEQ ID NO:3	Chromo- some Position	A1/A2 Allele	Control AF (High BMD)	Case AF (Low BMD)	p-Value	OR	Low BMD Associated Allele
				T=0.88	T=0.83			
1905733	49434	94793534	C/T	C=0.02	C=0.03	0.5881	1.41	C
				T=0.98	T=0.97			
1385408	49523	94793623	T/G	T=1.00	T=1.00			
				G=0.00	G=0.00			
1385409	49742	94793842	C/G	C=1.00	C=1.00			
				G=0.00	G=0.00			
1385410	49907	94794007	G/C	G=0.53	G=0.51	0.5313	0.93	C
				C=0.47	C=0.49			
1485028	50028	94794128	G/C	G=1.00	G=1.00			
				C=0.00	C=0.00			
1485027	50089	94794189	G/T	G=0.00	G=0.00			
				T=1.00	T=1.00			
2904483	51588	94795688	C/A	C=0.68	C=0.65	0.4125	0.90	A
				A=0.32	A=0.35			
1385406	52899	94796999	C/A	C=0.00	C=0.00			
				A=1.00	A=1.00			
1905732	54088	94798188	A/C	A=0.48	A=0.47	0.8078	0.97	C
				C=0.52	C=0.53			
2046418	56538	94800638	C/T	C=0.64	C=0.65	0.9229	1.01	C
				T=0.36	T=0.35			
2200377	59071	94803171	T/C	T=0.00	T=0.04			
				C=1.00	C=0.96			
1905731	59110	94803210	A/C	A=1.00	A=1.00			
				C=0.00	C=0.00			
1905730	59178	94803278	A/G	A=0.74	A=0.73	0.9270	0.99	G
				G=0.26	G=0.27			
975713	61087	94805187	T/C	T=1.00	T=1.00			
				C=0.00	C=0.00			
6820985	61300	94805400	C/G	C=0.99	C=0.99			
				G=0.01	G=0.01			
7670441	62171	94806271	T/C	T=0.67	T=0.66	0.7167	0.96	C
				C=0.33	C=0.34			
6810794	62783	94806883	T/A	T=1.00	T=1.00			
				A=0.00	A=0.00			
7676623	62983	94807083	T/C	T=0.00	T=0.00			
				C=1.00	C=1.00			
1154861	63908	94808008	C/T	C=0.73	C=0.70	0.2406	0.84	T
				T=0.27	T=0.30			
1032125	64088	94808188	G/T	G=0.50	G=0.51	0.9342	1.01	G
				T=0.50	T=0.49			
1485022	64941	94809041	A/T	A=1.00	A=0.98			
				T=0.00	T=0.02			

dbSNP rs#	Position in SEQ ID NO:3	Chromo- some Position	A1/A2 Allele	Control AF (High BMD)	Case AF (Low BMD)	p-Value	OR	Low BMD Associated Allele
1485024	65050	94809150	A/G	A=0.04	A=0.12	0.0000	3.18	A
				G=0.96	G=0.88			
3913651	68953	94813053	C/T	C=0.40	C=0.41	0.6884	1.05	C
				T=0.60	T=0.59			
4693319	70093	94814193	T/C	T=0.81	T=0.80	0.7260	0.95	C
				C=0.19	C=0.20			
1872383	71308	94815408	C/A	C=0.35	C=0.38	0.4769	1.10	C
				A=0.65	A=0.62			
2200376	73009	94817109	T/A	T=0.65	T=0.63	0.6117	0.92	A
				A=0.35	A=0.37			
7668090	74002	94818102	A/G	A=0.61	A=0.59	0.4762	0.92	G
				G=0.39	G=0.41			
7692930	74294	94818394	T/C	T=0.00	T=0.00			
				C=1.00	C=1.00			
967096	74879	94818979	G/C	G=0.00	G=0.00			
				C=1.00	C=1.00			
6822249	76936	94821036	G/T	G=0.20	G=			
				T=0.80	T=			
6532405	77195	94821295	G/A	G=0.44	G=0.46	0.5246	1.08	G
				A=0.56	A=0.54			
1017897	77683	94821783	T/C	T=0.75	T=0.72	0.3873	0.89	C
				C=0.25	C=0.28			
7672674	78283	94822383	T/C	T=0.81	T=0.82	0.6661	1.07	T
				C=0.19	C=0.18			
7694568	78331	94822431	C/T	C=0.82	C=0.91	0.0004	2.33	C
				T=0.18	T=0.09			
2904484	79362	94823462	G/C	G=0.67	G=0.66	0.8007	0.97	C
				C=0.33	C=0.34			
7340830	80357	94824457	C/T	C=1.00	C=1.00			
				T=0.00	T=0.00			
1485033	80653	94824753	T/C	T=0.74	T=0.73	0.6809	0.95	C
				C=0.26	C=0.27			
2870706	80840	94824940	A/G	A=0.65	A=0.65	0.9576	1.01	A
				G=0.35	G=0.35			
1905729	83203	94827303	A/G	A=0.66	A=0.62	0.1186	0.82	G
				G=0.34	G=0.38			
4693320	85405	94829505	T/C	T=0.67	T=0.73	0.0335	1.32	T
				C=0.33	C=0.27			
6848749	86441	94830541	G/T	G=0.14	G=0.22	0.0016	1.68	G
				T=0.86	T=0.78			
6532406	86967	94831067	G/A	G=0.98	G=0.95	0.0460	0.44	A
				A=0.02	A=0.05			
6532407	87121	94831221	T/C	T=0.95	T=0.91	0.0301	0.57	C

dbSNP rs#	Position in SEQ ID NO:3	Chromo- some Position	A1/A2 Allele	Control AF (High BMD) C=0.05 T=0.00 C=1.00	Case AF (Low BMD) T=0.00 C=1.00	p-Value	OR	Low BMD Associated Allele
1905728	89817	94833717	T/C					
6819866	90969	94835069	T/A	T=0.51 A=0.49	T=0.42 A=0.58	0.0157	0.70	A
1905727	94249	94838349	G/C	G=0.06 C=0.94	G=0.09 C=0.91	0.1689	1.48	G
7674069	95811	94839911	T/G	T=1.00 G=0.00	T=1.00 G=0.00			
1905724	96690	94840790	T/G	T=0.08 G=0.94	T=0.07 G=0.93	0.3032	1.31	T
1905723	96731	94840831	A/G	A=0.71 G=0.29	A=0.70 G=0.30	0.7768	0.96	G
1485020	97267	94841367	C/G	C=1.00 G=0.00	C=1.00 G=0.00			C
6814101	97414	94841514	T/G	T= G=	T=0.00 G=1.00			G

[0240] Allelotyping results were considered particularly significant with a calculated p-value of less than or equal to 0.05 for allelotype results. These values are indicated in bold. The allelotyping p-values were plotted in Figure 3. The position of each SNP on the chromosome is presented on the x-axis. The y-axis gives the negative logarithm (base 10) of the p-value comparing the estimated allele in the case group to that of the control group. The minor allele frequency of the control group for each SNP designated by an X or other symbol on the graphs in Figure 3 can be determined by consulting Table 19. For example, the left-most X on the left graph is at position 44917643. By proceeding down the Table from top to bottom and across the graphs from left to right the allele frequency associated with each symbol shown can be determined.

[0241] To aid the interpretation, multiple lines have been added to the graph. The broken horizontal lines are drawn at two common significance levels, 0.05 and 0.01. The vertical broken lines are drawn every 20kb to assist in the interpretation of distances between SNPs. Two other lines are drawn to expose linear trends in the association of SNPs to the disease. The light gray line (or generally bottom-most curve) is a nonlinear smoother through the data points on the graph using a local polynomial regression method (W.S. Cleveland, E. Grosse and W.M. Shyu (1992) Local regression models. Chapter 8 of Statistical Models in S eds J.M. Chambers and T.J. Hastie, Wadsworth & Brooks/Cole.). The black line provides a local test for excess statistical significance to identify regions of association. This was created by use of a 10kb sliding window with 1kb step sizes. Within each window, a chi-square goodness of fit

test was applied to compare the proportion of SNPs that were significant at a test wise level of 0.01, to the proportion that would be expected by chance alone (0.05 for the methods used here). Resulting p-values that were less than 10^{-8} were truncated at that value.

[0242] Finally, the exons and introns of the genes in the covered region are plotted below each graph at the appropriate chromosomal positions. The gene boundary is indicated by the broken horizontal line. The exon positions are shown as thick, unbroken bars. An arrow is place at the 3' end of each gene to show the direction of transcription.

Example 8

PDE4D Proximal SNPs

[0243] It has been discovered that a polymorphic variation (rs1498608) in a gene encoding *PDE4D* is associated with the occurrence of low BMD (see Examples 1 and 2). One hundred sixteen additional allelic variants proximal to rs1498608 were identified and subsequently allelotyped in low BMD case and high BMD control sample sets as described in Examples 1 and 2. The polymorphic variants are set forth in Table 20. The chromosome position provided in column four of Table 20 is based on Genome "Build 34" of NCBI's GenBank.

TABLE 20

dbSNP	Position in SEQ ID NO:4	Chromosome	Chromosome Position	Alleles (A1/A2)	genome_letter	deduced_lupac
6886495	249	5	58309549	g/c	g	S
6450498	543	5	58309843	a/t	a	W
1472456	973	5	58310273	g/a	c	Y
4700315	1076	5	58310376	a/g	a	R
4700316	1276	5	58310576	g/c	g	S
7714708	1599	5	58310899	a/g	a	R
7710479	2755	5	58312055	c/t	c	Y
2988013	2911	5	58312211	g/c	c	S
2988014	4466	5	58313766	a/g	a	R
2988015	5754	5	58315054	t/c	c	Y
1391848	5762	5	58315062	a/g	c	Y
2055297	5967	5	58315267	a/g	c	Y
2055296	5972	5	58315272	a/g	t	Y
3989138	6390	5	58315690	-/aa	a	N
4700317	6984	5	58316284	c/t	t	Y
2036220	7234	5	58316534	g/a	c	Y
7727206	8196	5	58317496	g/t	t	K
7723432	8369	5	58317669	a/g	a	R
1546221	9565	5	58318865	c/t	g	R

dbSNP	Position in SEQ ID NO:4	Chromosome	Chromosome Position	Alleles (A1/A2)	genome_letter	deduced_iupac
4479801	11084	5	58320384	c/t	c	Y
4395595	11153	5	58320453	c/t	c	Y
4395596	11187	5	58320487	t/c	c	Y
4699932	11290	5	58320590	g/a	a	R
2936201	11386	5	58320686	a/g	t	Y
7356672	11441	5	58320741	c/t	c	Y
2936200	12373	5	58321673	a/g	c	Y
1909296	12602	5	58321902	c/a	g	K
7703131	13763	5	58323063	c/g	c	S
7445308	18697	5	58327997	a/t	t	W
3087748	18854	5	58328154	t/c	g	R
4321723	19107	5	58328407	c/t	g	R
2988016	19310	5	58328610	c/t	c	Y
5868151	20074	5	58329374	c/-	c	N
1874858	20145	5	58329445	t/c	g	R
1874857	20281	5	58329581	a/c	t	K
7712922	23117	5	58332417	c/t	t	Y
4631140	23585	5	58332885	g/a	a	R
4469166	23906	5	58333206	t/c	t	Y
1078369	24046	5	58333346	c/g	g	S
1078368	24450	5	58333750	g/a	c	Y
2988006	24619	5	58333919	a/g	t	Y
2988005	24637	5	58333937	g/t	c	M
2936190	24894	5	58334194	c/t	c	Y
2409613	25030	5	58334330	g/c	g	S
4415048	25732	5	58335032	g/c	g	S
2988004	27108	5	58336406	a/c	g	K
2988003	27395	5	58336695	g/a	t	Y
2988002	28971	5	58338271	a/g	c	Y
2936191	29755	5	58339055	t/a	t	W
1498610	30988	5	58340288	a/g	g	R
6874662	31827	5	58341127	c/a	a	M
3060393	31843	5	58341143	a/aca	a	N
7729722	32773	5	58342073	g/a	a	R
7733884	32787	5	58342087	t/c	t	Y
7714489	33099	5	58342399	t/c	c	Y
7735570	36854	5	58346154	t/c	c	Y
2936193	38026	5	58347326	g/t	g	K
2291851	38397	5	58347697	t/c	c	Y
2291852	38680	5	58347980	a/g	a	R
1498602	39626	5	58348926	t/c	t	Y
1995166	39682	5	58348982	t/c	t	Y
1498603	39710	5	58349010	g/t	t	K
1498604	39745	5	58349045	c/a	a	M
1498605	39901	5	58349201	g/a	g	R

dbSNP	Position in SEQ ID NO:4	Chromosome	Chromosome Position	Alleles (A1/A2)	genome_letter	deduced_iupac
1948651	39925	5	58349225	c/t	t	Y
4699934	40356	5	58349656	g/t	t	K
4700319	40393	5	58349693	c/t	c	Y
2279737	41230	5	58350530	a/g	a	R
7720361	41733	5	58351033	c/t	c	Y
7706419	41877	5	58351177	g/t	g	K
1006431	43555	5	58352855	t/g	g	K
1353747	44066	5	58353366	g/t	t	K
1498606	44134	5	58353434	c/t	c	Y
1353748	44181	5	58353481	t/g	g	K
1553113	45022	5	58354322	a/c	a	M
2968012	46856	5	58356156	t/g	c	M
2968011	48231	5	58357531	c/a	t	K
1498608	49652	5	58358952	a/t	t	W
2936189	50393	5	58359693	t/a	a	W
1498609	51103	5	58360403	c/t	t	Y
2968019	51733	5	58361033	t/c	c	Y
6891238	54733	5	58364033	t/c	t	Y
2968010	57173	5	58366473	a/t	t	W
2968009	58192	5	58367492	c/t	g	R
2936203	58506	5	58367806	g/c	g	S
1498601	59572	5	58368872	g/a	t	Y
1498600	59738	5	58369038	a/g	t	Y
1498599	61617	5	58370917	g/a	t	Y
2936202	63980	5	58373280	c/g	c	S
7730070	64161	5	58373461	c/g	g	S
6450501	66871	5	58376171	a/g	g	R
6450502	67063	5	58376363	a/t	a	W
6889456	67084	5	58376384	a/g	a	R
6894618	67477	5	58376777	c/t	t	Y
7706044	69282	5	58378582	t/c	t	Y
7707541	70363	5	58379663	a/t	a	W
7712076	70647	5	58379947	c/t	t	Y
6892860	71834	5	58381134	c/t	c	Y
6867053	72130	5	58381430	c/g	c	S
7737269	73495	5	58382795	c/t	t	Y
6864156	74542	5	58383842	t/c	t	Y
950447	75280	5	58384580	t/c	a	R
2936196	80740	5	58390040	a/g	g	R
7719347	82579	5	58391879	t/c	t	Y
1391649	82591	5	58391891	c/a	a	M
1391650	82976	5	58392276	t/c	c	Y
1391651	83040	5	58392340	g/a	a	R
1353749	85894	5	58395194	g/a	a	R
10682149	86020	5	58395320	g/gcct	g	N

dbSNP	Position in SEQ ID NO:4	Chromosome	Chromosome Position	Alleles (A1/A2)	genome_letter	deduced_iupac
5868153	86947	5	58396247	g/ag	g	N
1363882	88922	5	58398222	c/g	g	S
2409626	89662	5	58398962	t/c	t	Y
2968018	92367	5	58401667	g/a	c	Y
954740	93154	5	58402454	a/g	c	Y
986067	94979	5	58404279	t/c	c	Y
6869400	97598	5	58406898	t/c	c	Y
5010782	98532	5	58407832	t/a	a	W

Assay for Verifying and Allelotyping SNPs

[0244] The methods used to verify and allelotype the proximal SNPs of Table 20 are the same methods described in Examples 1 and 2 herein. The primers and probes used in these assays are provided in Table 21 and Table 22, respectively.

TABLE 21

DbSNP rs#	Forward PCR primer	Reverse PCR primer
6888495	AGTTTGCTTCCTGAACAATC	ATGCAGTTGAATCTCAATAC
6450498	GGACAGCTTTATGTTTAATAC	ACAAATACTCCATTGATGGT
1472456	GGGAGGTAAGGAATCATGAC	TTTTGAAGGACAAGTCCCC
4700315	GGGAACCTTGTCCTTCAAAAAG	CATTTTCTGTTACTCTGAGG
4700316	ATTGTGTCATGCTTGGCAG	CCTCCTTCTATTGTGGAGAC
7714708	GCAACATACTAACTGGAATCC	GTTCTTCTGTTTGTGATGTGG
7710479	TGCTCCAAAAATGGCAATCG	ATTCTACATCACCAGGGAG
2968013	CACCCCTAGATTTTGAAGGT	CAATGACACATTCCTCACC
2968014	CCTTCCCTCCTTCATTCAAC	TGGATTGAGATTACGGGAGG
2968015	TGTCAGCTGTATGGTGAAGG	AACGCCAAGCCTATTTTCAG
1391648	AATTTGGTAAGACAGAGATG	TTGCTCTGTTCTGAAAGAC
2055297	AAGCTTTGTTTCTTTCTC	AACGATTCTACATCTGCCCC
2055296	AAGCTTTGTTTCTTTCTC	AACGATTCTACATCTGCCCC
3989138	GCCTTCCCCCTCCTTAAAA	CATTTGAGGATGAATACTTG
4700317	TTTTCCTGATATGATGAATG	CTAGTAATGCAGCAATAGTG
2036220	TGTATCCCAGGACATCTAGC	AACATTGAGGAAATTCAGG
7727208	AAGGACTGGGTTTGCATTTC	CTAATCTTGGCAACATTCTG
7723432	TGAATCTAGGAGTGGATTG	AGATCTGACCATGGTGATAG
1546221	GGAAACTCCTTATGTTGGA	GCTGTATATTATTAATCTGTG
4479801	ACTTCTAGAAGAAAACACAG	TATGCTTCATGCTTTTGTGG
4395595	AAACCACAAAAGCATGAAGC	TGGCTTGTTGTTCTGTTTTTC
4395598	ATATCCCTTCTCAAGTCTG	CTGGACTTTACCAAATTTCTC
4699932	CCATCTTTTCACTGGATTGTC	CAGACTTGAGAAGGGAATATG
2936201	GCATCTCACTGTGGTTTAC	CACAATAAGAGGACAATCCAG
7356672	GACCATCATTAGACATTAGGG	TTAATTTGCTCTGCATCCAG
2936200	TCACAACCTGGGAATTCCTG	GAGCTCCACCATTATTTCCC

DbSNP rs#	Forward PCR primer	Reverse PCR primer
1909296	CCGAGTAGCTGGGATTACAT	TGGTGAAACCCTGTCTCTAC
7703131	AGAGAAGAAGGCTTCAGACG	TTTAGCTTCTTTGCGATGGG
7445308	ATACAGCGGTTGGGACTATC	GCACATTGTGCACATGTACC
3087748	TAGTCCATAGGAATCTGCTG	GCTGCTGTACATTACAACAC
4321723	GAATTTTACTTGAACCCTGG	CCTATCTTACTACTGAAGTC
2968016	GTAAACCTTGGACTTATGGG	ACGATGTTACCCTCTTTTCC
5868151	TAGAATAGACTACATCCATC	GGATAAGGAAGTTTCTTAGG
1874858	GCCTAAGAACTTCCTTATCC	ATATTGCCAACTAGGAGTAC
1874857	ATGAAGACTTTACTGAAGGC	CATACACTACTAACCTGTTGC
7712922	CTCTTTCTAAGGGCTTCTGG	AGAGGAGTCGGACTTTGTTC
4631140	TTGAAGTTGAGAGGGTCTCC	AAGCAAAGCACAAGCAACAG
4469166	TTAGGAGGGATGAGGAATGG	CTCCAATTGCACTGGGTTAC
1078369	TCCCTGAGCCTCTGTTTCC	ATATGTCCCCACCACACTAC
1078368	ATGACTCATGGAGGCAACAG	GGAGAGCGATTTATGGATGG
2968006	CAGGGTTCATTTGGTGAAAC	ACTGACCTGTCTGGGATTTT
2968005	ACTGACCTGTCTGGGATTTT	CGCAGGGTTCATTTGGTGAA
2936190	AACAGACCTCCAACACAACC	TAGGATAAACTCACGGAAGG
2409613	AATAGGGTCAGTGGGATGAG	CCCACCTCCAAATCCTTTAC
4415048	CACCCAGCCTCAGAATATTT	TTCCCCACCAATACAACATC
2968004	CCCAAACATTATCTTCTGGC	GATCTCCATAAGGGTAAGTG
2968003	ACAAGAGGACAAGTGTTAG	GGCCAGAGCTGTTTCATAAT
2968002	CCTTTGACTTTCCACAGAAC	ACACTCACTGGGTGGGCTA
2936191	TGACCTTGATAACCTGGCTG	AGCTGTGCATATTGACTTCC
1498610	CATTAAATCACCACAGCAAC	TCCTTAGGCAGAATGGTC
6874662	ACTCTAGCCTGGGCAACAGA	ATGTCTTGTAGTTTCCAGTG
3060393	CCAGTGTATAGATCTTTCACC	AGAGCGAGACTCCATCACAA
7729722	GAGGAAAGTGTGTCTATTGAG	CCATACATCTGATAAGAGGC
7733884	TGTATCTCTGTTGGCCATTC	CCATACATCTGATAAGAGGC
7714489	AGGGTCTTGCTCTTTGTTC	ATTGAGCCCGAGAATTTGAG
7735570	AGGATCTTCATAGAAGTGGC	AACTGAGGCTGTTTTCTCTC
2936193	CTTAGCATACAATGGGCACC	ACAGTGCCTACTATTGTCAG
2291851	GTTTCTTGCTTGTTGATGGC	TAGCCTTGGCCAAGAATTCA
2291852	ATCCTGATCTCTTACTAGTG	TTCTGTGTTCTCTTTGAGG
1498602	CAGTAGTTTTTCAGCTAAATG	ATCCAAACATAGATCTCAAC
1895166	GCCACTTAGCAATGTGCAAG	GGGAAAGTAACTAGCTGCTC
1498603	GTGTGGTTGATTCTGTGTAAG	ACTACTGTGCAATCACCTTG
1498604	GCTTGACATTGCTAAGTGG	CCATGGGCCTGAGTTCTTAA
1498605	CTGTGGCATTAGGCACCTTT	AGGACACTGGACATATTGAG
1948651	CAGATGAGAATAAAGGTGCC	TATTGCTCTCTTACTGGGAC
4699934	AGGACTGGTAATGTTGTGAG	GACCTTGTAATAGGTGGCC
4700319	GACCTTGTAATAGGTGGCC	GCTGAAGGATTGAGCCAGTA
2279737	AAAACCTCTCAATTTATTTT	ATGGCCTCCAACAAGGTAAG
7720361	ACTATGCGACTTTTCAACTG	ACCCCTCGCCATCCGCTA
7706419	ACCCGGCCGCGGCTGATTCAT	GCCCCGCTGCCGAGCCTT
1008431	CCTTGCCAGGTGAATTAAG	CTATACAGAGCAGGTATTTT
1353747	TGAGAAAGTTGGAGTGCAGG	AATCATTGGTTACAATGAAG
1498606	ACTCCAACCTTCTCAAAGCC	TTGGTGAAGATGGAGGAAGG
1353748	CTCCATCTTCACCAAGTTCC	GAAATATAATGTGTGGAGCC

DbSNP rs#	Forward PCR primer	Reverse PCR primer
1553113	AGCCTTTAGGGAGTTTAGCC	GCACCAAATCTTGCTAAGTC
2968012	CAGTTCATCTACTGTAGAC	CAGTCCAGCTTCTCTTCTC
2968011	ATAATGGTTGCACTGACTTC	ACTGTGTGACATGGGATCTG
1498608	GAATCCCTGTTCACTCCTTG	ATAACCTCGGGGTCCAGAAA
2938189	TGATCTCAGACTTCCAGCTC	TTTGTCTTAGCTCAAGCTGC
1498609	TAGCTCAACTGTTCTTCAGG	CAGAGTGAGTGTAATATAC
2968019	CCCAGGCCAGTATTACTGTT	TGACATTTACAGGCACTCAG
6891238	CCTTTATTCAGGCTGCAGAC	TGTGGTTTTAATGGCTGTGG
2968010	ATGTATGATTCACTCTGATG	CAAACCAATTGGTAGATTC
2968009	GTAGGCAAAGATGAATCACG	TGTTTTACCTAGCAAAGGAGC
2936203	AGTTCAGAGGTTCCAGACAG	AGCCAAGCTTGCAAACCTCTG
1498601	TTGGTTAGATCCAGCTCTGC	TAAGAGGAACAGGGATCTGC
1498600	ATATAGGTAAGTCTTCTCC	CCTTGTTTCCAAATCTGAGC
1498599	GGAACATTTGGCTACATCATG	CCACAGAGCTGATTTAATTC
2936202	TGTAAGAGGAGGGTGTGATG	TGACTCTGCAGGACTGTCTG
7730070	AAATATACTTGGGTAGAGAG	GATAGCTAACACATTTCTGAC
6450501	AGCTAGACTACATAGCCTCC	TGTAGGACATGACAGCAAAC
6450502	TAACAAGTCAAAACAGATGG	ATTTTCAATATTCTGCACAC
6889456	GGATCTCTATTAAACCTCTC	TTCAAGGGTACTGATACTC
6894618	CCATCAACAGATGAATGGAC	TCCTTCCTTTTTTAGGGCTG
7706044	GACTTGGTATTTTGTGAGGG	TCCACCATGTGAGGACAAAG
7707541	TTTTGAGTCATGAAAACTG	CACATGTATTAATTAAGTAGG
7712076	AAGCCATACCACAAGCATTG	GTTACCGTGAAATACACTACC
6892860	CAGAAGATGCAATGAAAAGAC	AGAACAAAATGTTAGGACGC
6867053	TTATCCGCATTCCACTCTTG	ACACTGGTCTCTATAACAAG
7737269	TTTAAAGGCTCGCACCTCAG	TCCGAAGGAAAGTGATTCTC
6864156	GTTGGATCATCAAAAAGTGG	GGCTAGAGTACTAAAAATCAG
950447	GTGAGTAGTCTGAATTTGTC	AGGCTTCAGAATCGGTCATC
2936196	CTCCAAAACATAGTAAGTGC	TGAACATTTAGAATTAGGGG
7719347	ACATTCTGAGGTCATGCAGG	CTCAGAGCCTGCATTATCTC
1391649	GCTAATGCTTTACTCTGGTC	CACACTCCAAAATGTGCAAC
1391650	TTGAGCTGATACTTGCTCCC	CTCTACCTACCAACATCGTC
1391651	TTGACGTGATAGAAGTTTGG	CTGAAAAGGGTGGCTTTCTC
1353749	TATAGAGCAAAAAGCCAAGG	CCACTTCTACCACATTCTTC
10682149	GGGAGAATATAACCATTAAGT	GAATTGCATTTTATCCAATC
5868153	CATAGGGACTATTTAACTTC	GAGTGTTCTTTAGAGATTAAG
1363882	CTCACACAGGCAATGAGTAG	AGCCACTACTTCTCAATCTC
2409626	CCTGGTCTCAAGCAATCATC	ATAAGGCCAGATGTGGTGAC
2968018	GCAGAGAGATGAGAGGAAAC	CCTCATATCTAATCTCTCCC
954740	ATACTTGGGAGCACTCAACG	CAACAAGACGGAATCCAAAG
986067	CTACAAATTGCTTAAGCAGGG	TGATAGAGTAGAGAGACTCC
6869400	ACAAGATCGTTGAATGGTGG	GACTTTGTATACTGCCACTC
5010782	AATCTGTGGGAGTTAGTGGT	TTCTCATCCTCATCTTCCC

TABLE 22

dbSNP rs#	Extend Primer	Term Mix
6886495	CCTGAACAATCTTAAATGC	ACT
6450498	GTCTTATGCATTTTGAAGG	CGT
1472456	GGAATCATGACTACTTGGGA	ACG
4700315	GAAACAAAGCAAACGAC	ACT
4700316	TGCTTGGCAGGCTTTTT	ACT
7714708	CAGTATAAGTAATTTGGCCC	ACT
7710479	GAGCATTTTAATTGCTTCC	ACG
2968013	AGCTGAGAGCAGCCATG	ACT
2968014	GAGCTGTTTCTTTCAGTTT	ACT
2968015	ATGGTGAAGGTGGAGGA	ACT
1391648	TCAGCTGTATGGTGAAG	ACT
2055297	GTGCCTGACATAGAGTAG	ACT
2055296	GGCAGTGCCTGACATAG	ACT
3989138	CCCCTCCTTTAAAAAAAAAAAA	CGT
4700317	CAAATGTAACAAAGTGCCA	ACG
2036220	GCCTCCCTGGCCTCTGC	ACG
7727206	AATCCTGTACCTATGG	CGT
7723432	GTGCCTTGAATTAAAGAATC	ACT
1546221	CTTATGTTGGAGAGGTC	ACG
4479801	TAGAAAGTAGTTGTGATCTTG	ACG
4395595	AAAAATGGTATACTGGACTTTA	ACG
4395596	CTGTGGCTTGTTGTTCT	ACT
4699932	CACTGGATTGCCTCTTA	ACG
2936201	CCTAATGTCTAATGATGGTC	ACT
7356672	CACAGTGAGATGCCACA	ACG
2936200	CTTGGATAACTGTATGCCT	ACT
1909296	TTACATGAGTGCACCAC	CGT
7703131	GGTAATAAACTTTTCCGAG	ACT
7445308	GTTGGGACTATCTACTTTTTT	CGT
3087748	CATAGGAATCTGCTGCCTCAC	ACT
4321723	ACTTGGAACCCTGGTATTTT	ACG
2968016	GGGGCAAAAAGACAATAAA	ACG
5868151	GAATAGACTACATCCATCAAAATA	ACG
1874858	GAAACTTCCTTATCCAAGGCC	ACT
1874857	GCAATTAAAAGTGGTACAATAA	ACT
7712922	CAATAAAAGGAAAGAGACTTC	ACG
4631140	AGAGGGTCTCCTGTAGG	ACG
4469166	GAGGAATGGAATATTTTAAAC	ACT
1078369	CTCTGTTTTCCCTGTAAAT	ACT
1078368	GCAACAGGTGAAGCTGA	ACG
2968006	GACTGAACCTTTAGGAGA	ACT
2968005	TTCTCCTAAAGGTTTCAGT	CGT
2936190	CCAACACAACCTCTTAA	ACG
2409613	CCAAGTGACTAAAGCAGAT	ACT

dbSNP rs#	Extend Primer	Term Mix
4415048	AAAACCTAATGCTCAGTTAAA	ACT
2968004	TCTGGCATAAAGTAACTAATC	ACT
2968003	GGGGACTAGTCAACAAA	ACG
2968002	TCTGATGAGGTCTTCTAC	ACT
2936191	GGCTGAAGTAGTGATAGG	CGT
1498610	GAAGCACAGAAGGCAAC	ACT
6874662	CAGAGCGAGACTCCATC	CGT
3060393	GATTTGCTCCTAAGTTTTT	ACT
7729722	GTGTCTATTCAGATCCTTG	ACG
7733884	TTGAGGAAAGTGTGTCT	ACT
7714489	GGCTGGAGTGCAGTGGC	ACT
7735570	TCCACATTATGCAACTACA	ACT
2936193	AAAAGTCAGTGTAAGAGTTC	CGT
2291851	TGATGGCATTGAAGCAG	ACT
2291852	GTTTTATTGTGCTTTTCAATCT	ACT
1498602	GAATTGAGCAGCTAGTT	ACT
1995166	TGTGCAAGCATTAGTGTAT	ACT
1498603	GAGCAGAATCAAAAGCC	CGT
1498604	GCTCTTCATTTTCTTACACAG	CGT
1498605	AGGCACCTTTATTCTCAT	ACG
1948651	GAATAAAGGTGCCTAATGC	ACG
4699934	GTAATAGTTGCCTCGTC	CGT
4700319	TTACTAATTGTCTCACAACATTA	ACG
2279737	TCGCCGGCATGGGAATC	ACT
7720361	AGTCCCAGTCCAGGAGC	ACG
7706419	TTCACTCACTTCAAGTGC	CGT
1006431	GTGAATTAAAGTTTCAGATTGAA	ACT
1353747	GGAGAGGAGCCACAGAA	CGT
1498606	CAAGTGATTTCAGTAG	ACG
1353748	ACCAAGTCCCAAAGCT	ACT
1553113	GGAGTTTAGCCAATAGTTTTTGC	ACT
2968012	GACAGTATCAATTCCTTCC	ACT
2968011	TGACTTCACTTTACTTTCTT	CGT
1498608	CCCTAAAACTGTTCCAGGTA	CGT
2936189	CCAGAAGTGTGAGAAATAA	CGT
1498609	GTTTTCTATTGAAATTGAGGTAT	ACG
2968019	CCAGTATTACTGTTGAATCTC	ACT
6891238	CTGCAGACATTTCTTAC	ACT
2968010	TTCACTCTGATGTTTTCTATT	CGT
2968009	CATAACCTCTGGTTTCC	ACG
2936203	GGAGGATATCCATGCCCC	ACT
1498601	AGCTCTGCCTCCCCATT	ACG
1498600	AGGTGCCAAGCTAGTCA	ACT
1498599	GGCTACATCATGTTTTGG	ACG
2936202	CCCTGGTAACTGTAGTG	ACT
7730070	TAGGCATGCTCAAACCTC	ACT

dbSNP rs#	Extend Primer	Term Mix
6450501	GCCTCCTAAAAAAGCAC	ACT
6450502	GTTTAATGACATTTTAGAGAGG	CGT
6889456	AACCTCTCTAAATGTCATTAA	ACT
6894618	GGACAAAGGAAATGTGATATATA	ACG
7706044	GGCTCATTTCTGGGTC	ACT
7707541	GAAAACTGACAACATATGAG	CGT
7712076	CCCAGAGGATATAGATTTTCAT	ACG
6892860	GGATATTTCACTGGTGCT	ACG
6867053	CACCATTAACCTGGTCTA	ACT
7737269	ACTCTTGATCAATAGTTTGG	ACG
6864156	GTAGTTGACAAATCTTACCT	ACT
950447	TTGTTAGTGTATTAGCCATTG	ACT
2936196	GTGCAAAGATCAATCACA	ACT
7719347	GGTCATGCAGGAAATAG	ACT
1391649	TCTGGTCTATTTCTGCT	CGT
1391650	CCCACAGGTTTTTCACA	ACT
1391651	GGGCCCCCGTTTTGCCCTG	ACG
1353749	CAAAAAGCCAAGGATATAAAATA	ACG
10682149	GTATGATCTGATTTCCATAAATAG	ACT
5868153	GAAATGAATAAATGGCAAAAAA	ACT
1363882	GCAATGAGTAGACTAAAAAAA	ACT
2409626	AGCAATCATCCCACCTC	ACT
2968018	CAGACACCCACTGACCA	ACG
954740	ACGAAGGTCCCGTCTGA	ACT
986067	CAGGGATTTAAATGAAACC	ACT
6869400	AATGGTGGGTCATTAGTT	ACT
5010782	GCACCTACAGAGGAAAT	CGT

Genetic Analysis

[0245] Allelotyping results are shown for female cases and controls in Table 23. The allele frequency for the A2 allele is noted in the fifth and sixth columns for control pools and case pools, respectively, where “AF” is allele frequency. Some SNPs do not have an allele frequency disclosed because of failed assays.

TABLE 23

dbSNP rs#	Position in SEQ ID NO:4	Chromosome Position	A1/A2 Allele	Control AF (High BMD)	Case AF (Low BMD)	p-Value	OR	Low BMD Associated Allele
6886495	249	58309549	G/C	G=	G=0.87			
				C=	C=0.13			
6450498	543	58309843	A/T	A=0.81	A=0.85	0.1780	1.29	A

dbSNP rs#	Position in SEQ ID NO:4	Chromosome Position	A1/A2 Allele	Control AF (High BMD) T=0.19	Case AF (Low BMD) T=0.15	p-Value	OR	Low BMD Associated Allele
1472456	973	58310273	G/A	G=1.00 A=0.00	G=1.00 A=0.00			
4700315	1076	58310376	A/G	A= G=	A=0.95 G=0.05			
4700316	1276	58310576	G/C	G=0.87 C=0.13	G=0.84 C=0.16	0.1520	0.75	C
7714708	1599	58310899	A/G	A=0.35 G=0.65	A=0.46 G=0.54	0.0013	1.60	A
7710479	2755	58312055	C/T	C=1.00 T=0.00	C=1.00 T=0.00			
2968013	2911	58312211	G/C	G=0.84 C=0.16	G=0.80 C=0.20	0.1256	0.79	C
2968014	4466	58313766	A/G	A=0.22 G=0.78	A=0.25 G=0.75	0.2834	1.16	A
2968015	5754	58315054	T/C	T=0.88 C=0.12	T=0.86 C=0.14	0.2038	0.80	C
1391648	5762	58315062	A/G	A=0.25 G=0.75	A=0.24 G=0.76	0.8566	0.97	G
2055297	5967	58315267	A/G	A=0.00 G=1.00	A=0.00 G=1.00			
2055296	5972	58315272	A/G	A=0.94 G=0.06	A=0.94 G=0.06	0.8857	1.04	A
3989138	6390	58315690	-/AA	--0.53 AA=0.47	--0.50 AA=0.50	0.3703	0.90	A
4700317	6984	58316284	C/T	C=0.00 T=1.00	C=0.00 T=1.00			
2036220	7234	58316534	G/A	G=0.44 A=0.56	G=0.44 A=0.56	0.9272	1.01	G
7727206	8196	58317496	G/T	G=0.27 T=0.73	G=0.25 T=0.75	0.3954	0.89	T
7723432	8369	58317669	A/G	A=0.82 G=0.18	A=0.82 G=0.18	0.7671	1.05	A
1548221	9565	58318865	C/T	C=0.83 T=0.17	C=0.84 T=0.16	0.7282	1.06	C
4479801	11084	58320384	C/T	C=0.86 T=0.14	C=0.87 T=0.13	0.7440	1.07	C
4395595	11153	58320453	C/T	C=0.93 T=0.07	C=0.93 T=0.07	0.7241	1.09	C
4395596	11187	58320487	T/C	T=0.01 C=0.99	T=0.02 C=0.98			
4699932	11290	58320590	G/A	G=0.13	G=0.10	0.1440	0.76	A

P A T E N T
Docket **SEQ-4095-PV**

dbSNP rs#	Position in SEQ ID NO:4	Chromosome Position	A1/A2 Allele	Control AF (High BMD) A=0.87	Case AF (Low BMD) A=0.90	p-Value	OR	Low BMD Associated Allele
2936201	11386	58320686	A/G	A=0.17 G=0.83	A=0.19 G=0.81	0.3609	1.15	A
7356672	11441	58320741	C/T	C=0.88 T=0.12	C=0.89 T=0.11	0.4757	1.17	C
2936200	12373	58321673	A/G	A=1.00 G=0.00	A=1.00 G=0.00			
1909296	12602	58321902	C/A	C=0.98 A=0.02	C=0.99 A=0.01			
7703131	13763	58323063	C/G	C= G=	C= G=			
7445308	18697	58327997	A/T	A=0.00 T=1.00	A=0.00 T=1.00			
3087748	18854	58328154	T/C	T= C=	T=0.21 C=0.79			
4321723	19107	58328407	C/T	C=0.19 T=0.81	C=0.24 T=0.76	0.1033	1.30	C
2968016	19310	58328610	C/T	C=0.45 T=0.55	C=0.44 T=0.56	0.7959	0.96	T
5868151	20074	58329374	C/-	C=0.44 -=0.56	C=0.43 -=0.57	0.6659	0.95	-
1874858	20145	58329445	T/C	T=0.12 C=0.88	T=0.17 C=0.83	0.1558	1.43	T
1874857	20281	58329581	A/C	A=0.96 C=0.04	A=0.96 C=0.04	0.5485	0.83	A
7712922	23117	58332417	C/T	C=0.05 T=0.95	C=0.00 T=1.00			
4631140	23585	58332885	G/A	G=0.10 A=0.90	G=0.09 A=0.91	0.4903	0.87	A
4469166	23906	58333206	T/C	T=0.97 C=0.03	T=0.98 C=0.02	0.6510	1.30	T
1078369	24046	58333346	C/G	C=0.88 G=0.12	C=0.88 G=0.12	0.8279	0.96	C
1078368	24450	58333750	G/A	G=0.50 A=0.50	G=0.47 A=0.53	0.3033	0.89	A
2968006	24619	58333919	A/G	A=0.34 G=0.66	A=0.35 G=0.65	0.5216	1.08	A
2968005	24637	58333937	G/T	G=0.37 T=0.63	G=0.36 T=0.64	0.7332	0.96	T
2936190	24894	58334194	C/T	C=0.22 T=0.78	C=0.22 T=0.78	0.9071	1.02	C
2409613	25030	58334330	G/C	G=1.00 C=0.00	G=1.00 C=0.00			

dbSNP rs#	Position in SEQ ID NO:4	Chromosome Position	A1/A2 Allele	Control AF (High BMD) G=0.94 C=0.06	Case AF (Low BMD) G=0.96 C=0.04	p-Value	OR	Low BMD Associated Allele
4415048	25732	58335032	G/C			0.2666	1.36	G
2968004	27106	58336406	A/C	A=0.92 C=0.08	A=0.88 C=0.12	0.1210	0.70	C
2968003	27395	58336695	G/A	G=0.61 A=0.39	G=0.66 A=0.34	0.2364	1.23	G
2968002	28971	58338271	A/G	A=0.81 G=0.19	A=0.81 G=0.19	0.8196	1.04	A
2936191	29755	58339055	T/A	T=1.00 A=0.00	T=1.00 A=0.00			
1498610	30988	58340288	A/G	A=0.00 G=1.00	A=0.00 G=1.00			
6874662	31827	58341127	C/A	C=0.00 A=1.00	C=0.00 A=1.00			
3060393	31843	58341143	-/CA	-=1.00 CA=0.00	-=1.00 CA=0.00			
7729722	32773	58342073	G/A	G=0.01 A=0.99	G=0.01 A=0.99			
7733884	32787	58342087	T/C	T=0.96 C=0.04	T=0.97 C=0.03	0.5282	1.26	T
7714489	33099	58342399	T/C	T=0.15 C=0.85	T=0.14 C=0.86	0.7668	0.95	C
7735570	36854	58346154	T/C	T=0.08 C=0.92	T=0.09 C=0.91	0.4593	1.18	T
2936193	38026	58347326	G/T	G=0.25 T=0.75	G=0.28 T=0.72	0.3638	1.14	G
2291851	38397	58347697	T/C	T=0.05 C=0.95	T=0.06 C=0.94	0.2114	1.40	T
2291852	38680	58347980	A/G	A=0.98 G=0.02	A=0.98 G=0.02			
1498602	39626	58348926	T/C	T=0.67 C=0.33	T=0.61 C=0.39	0.0496	0.77	C
1995166	39682	58348982	T/C	T=0.54 C=0.46	T=0.55 C=0.45	0.7840	1.03	T
1498603	39710	58349010	G/T	G=0.03 T=0.97	G=0.02 T=0.98			
1498604	39745	58349045	C/A	C=0.16 A=0.84	C=0.13 A=0.87	0.2329	0.79	A
1498605	39901	58349201	G/A	G=0.88 A=0.12	G=0.89 A=0.11	0.3713	1.18	G
1948651	39925	58349225	C/T	C=0.58 T=0.42	C=0.56 T=0.44	0.5199	0.93	T
4699934	40356	58349656	G/T	G=0.13	G=0.05	0.0043	0.35	T

dbSNP rs#	Position in SEQ ID NO:4	Chromosome Position	A1/A2 Allele	Control AF (High BMD) T=0.87	Case AF (Low BMD) T=0.95	p-Value	OR	Low BMD Associated Allele
4700319	40393	58349693	C/T	C= T=	C=0.98 T=0.02			
2279737	41230	58350530	A/G	A=0.82 G=0.18	A=0.80 G=0.20	0.3520	0.87	G
7720361	41733	58351033	C/T	C=1.00 T=0.00	C=1.00 T=0.00			
7706419	41877	58351177	G/T	G=0.89 T=0.11	G=0.92 T=0.08	0.1509	1.38	G
1006431	43555	58352855	T/G	T=0.22 G=0.78	T=0.30 G=0.70	0.0077	1.49	T
1353747	44066	58353366	G/T	G=0.23 T=0.77	G=0.15 T=0.85	0.0025	0.61	T
1498608	44134	58353434	C/T	C=0.85 T=0.15	C=0.87 T=0.13	0.3475	1.17	C
1353748	44181	58353481	T/G	T=0.65 G=0.35	T=0.66 G=0.34	0.8645	1.02	T
1553113	45022	58354322	A/C	A=0.95 C=0.05	A=0.97 C=0.03	0.1730	1.54	A
2968012	46856	58356156	T/G	T=0.66 G=0.34	T=0.66 G=0.34	0.9069	1.01	T
2968011	48231	58357531	C/A	C=0.67 A=0.33	C= A=			
1498608	49652	58358952	A/T	A=0.19 T=0.81	A=0.13 T=0.87	0.0118	0.64	T
2936189	50393	58359693	T/A	T=0.63 A=0.37	T=0.65 A=0.35	0.6021	1.08	T
1498609	51103	58360403	C/T	C=0.34 T=0.66	C=0.40 T=0.60	0.0314	1.30	C
2968019	51733	58361033	T/C	T=0.62 C=0.38	T=0.64 C=0.36	0.5417	1.08	T
6891238	54733	58364033	T/C	T=1.00 C=0.00	T=1.00 C=0.00			
2968010	57173	58366473	A/T	A=0.90 T=0.10	A=0.95 T=0.05	0.0012	2.28	A
2968009	58192	58367492	C/T	C=0.65 T=0.35	C=0.70 T=0.30	0.0959	1.24	C
2936203	58506	58367806	G/C	G=0.17 C=0.83	G=0.14 C=0.86	0.1730	0.80	C
1498601	59572	58368872	G/A	G=0.81 A=0.19	G=0.78 A=0.22	0.3899	0.83	A
1498600	59738	58369038	A/G	A=0.48 G=0.52	A=0.46 G=0.54	0.5991	0.94	G

dbSNP rs#	Position in SEQ ID NO:4	Chromosome Position	A1/A2 Allele	Control AF (High BMD) G=0.69 A=0.31	Case AF (Low BMD) G=0.69 A=0.31	p-Value	OR	Low BMD Associated Allele
1498599	61617	58370917	G/A			0.9739	1.00	G
2936202	63980	58373280	C/G	C=0.20 G=0.80	C=0.14 G=0.86	0.0286	0.68	G
7730070	84161	58373461	C/G	C=0.74 G=0.26	C=0.73 G=0.27	0.5744	0.93	G
6450501	66871	58376171	A/G	A=0.00 G=1.00	A=0.09 G=0.91			
6450502	67063	58376363	A/T	A=1.00 T=0.00	A=1.00 T=0.00			
6889456	67084	58376384	A/G	A= G=	A=1.00 G=0.00			
6894618	67477	58376777	C/T	C=0.69 T=0.31	C=0.73 T=0.27	0.1542	1.21	C
7706044	69282	58378582	T/C	T= C=	T=1.00 C=0.00			
7707541	70363	58379663	A/T	A=0.63 T=0.37	A=0.61 T=0.39	0.5874	0.93	T
7712076	70647	58379947	C/T	C=0.00 T=1.00	C=0.00 T=1.00			
6892860	71834	58381134	C/T	C=0.81 T=0.19	C=0.83 T=0.17	0.4091	1.14	C
6867053	72130	58381430	C/G	C=0.46 G=0.54	C=0.44 G=0.56	0.4563	0.91	G
7737269	73495	58382795	C/T	C=0.00 T=1.00	C=0.00 T=1.00			
6864156	74542	58383842	T/C	T=0.99 C=0.01	T=0.99 C=0.01			
950447	75280	58384580	T/C	T= C=	T=1.00 C=0.00			
2936196	80740	58390040	A/G	A=0.00 G=1.00	A=0.00 G=1.00			
7719347	82579	58391879	T/C	T=1.00 C=0.00	T=1.00 C=0.00			
1391649	82591	58391891	C/A	C=0.42 A=0.58	C=0.35 A=0.65	0.0162	0.74	A
1391650	82976	58392276	T/C	T=0.75 C=0.25	T=0.75 C=0.25	0.9568	0.99	T
1391651	83040	58392340	G/A	G=0.58 A=0.42	G=0.59 A=0.41	0.8831	1.02	G
1353749	85894	58395194	G/A	G=0.43 A=0.57	G=0.39 A=0.61	0.1596	0.85	A
10682149	86020	58395320	-/CCT	-=0.37	-=0.39	0.5382	1.08	-

dbSNP rs#	Position in SEQ ID NO:4	Chromosome Position	A1/A2 Allele	Control AF (High BMD) CCT=0.63	Case AF (Low BMD) CCT=0.61	p-Value	OR	Low BMD Associated Allele
5868153	86947	58396247	A/-	A=0.72 - =0.28	A=0.71 - =0.29	0.7470	0.96	-
1363882	88922	58398222	C/G	C=0.45 G=0.55	C=0.43 G=0.57	0.5228	0.93	G
2409626	89662	58398962	T/C	T=0.84 C=0.16	T=0.85 C=0.15	0.8581	1.03	T
2988018	92367	58401667	G/A	G=0.75 A=0.25	G=0.75 A=0.25	0.8411	0.97	G
954740	93154	58402454	A/G	A=0.00 G=1.00	A=0.00 G=1.00			
986067	94979	58404279	T/C	T=0.04 C=0.96	T=0.06 C=0.94	0.2475	1.43	T
8869400	97598	58406898	T/C	T=0.00 C=1.00	T=0.00 C=1.00			
5010782	98532	58407832	T/A	T=0.88 A=0.32	T=0.69 A=0.31	0.8644	1.02	T

[0246] Allelotyping results were considered particularly significant with a calculated p-value of less than or equal to 0.05 for allelotype results. These values are indicated in bold. The allelotyping p-values were plotted in Figure 4. The position of each SNP on the chromosome is presented on the x-axis. The y-axis gives the negative logarithm (base 10) of the p-value comparing the estimated allele in the case group to that of the control group. The minor allele frequency of the control group for each SNP designated by an X or other symbol on the graphs in Figure 4 can be determined by consulting Table 23. For example, the left-most X on the left graph is at position 58309549. By proceeding down the Table from top to bottom and across the graphs from left to right the allele frequency associated with each symbol shown can be determined.

[0247] To aid the interpretation, multiple lines have been added to the graph. The broken horizontal lines are drawn at two common significance levels, 0.05 and 0.01. The vertical broken lines are drawn every 20kb to assist in the interpretation of distances between SNPs. Two other lines are drawn to expose linear trends in the association of SNPs to the disease. The light gray line (or generally bottom-most curve) is a nonlinear smoother through the data points on the graph using a local polynomial regression method (W.S. Cleveland, E. Grosse and W.M. Shyu (1992) Local regression models. Chapter 8 of Statistical Models in S eds J.M. Chambers and T.J. Hastie, Wadsworth & Brooks/Cole.). The black line provides a local test for excess statistical significance to identify regions of association. This was created by use of a 10kb sliding window with 1kb step sizes. Within each window, a chi-square goodness of fit

test was applied to compare the proportion of SNPs that were significant at a test wise level of 0.01, to the proportion that would be expected by chance alone (0.05 for the methods used here). Resulting p-values that were less than 10^{-8} were truncated at that value.

[0248] Finally, the exons and introns of the genes in the covered region are plotted below each graph at the appropriate chromosomal positions. The gene boundary is indicated by the broken horizontal line. The exon positions are shown as thick, unbroken bars. An arrow is place at the 3' end of each gene to show the direction of transcription.

Example 9

GPX3 Proximal SNPs

[0249] It has been discovered that a polymorphic variation (rs869975) in a gene encoding *GPX3* is associated with the occurrence of low BMD (see Examples 1 and 2). Two hundred thirty-three additional allelic variants proximal to rs869975 were identified and subsequently allelotyped in low BMD case and high BMD control sample sets as described in Examples 1 and 2. The polymorphic variants are set forth in Table 24. The chromosome position provided in column four of Table 24 is based on Genome "Build 34" of NCBI's GenBank.

TABLE 24

dbSNP	Position in SEQ ID NO:5	Chromosome	Chromosome Position	Alleles (A1/A2)	genome_letter	deduced_iupac
1478398	231	5	150385031	a/g	t	Y
1478397	330	5	150385130	t/c	a	R
1160114	582	5	150385382	g/c	g	S
1160113	589	5	150385389	a/g	c	Y
1382323	1060	5	150385860	a/g	c	Y
1160112	1066	5	150385866	g/a	t	Y
7709870	1311	5	150386111	g/a	a	R
7710643	1556	5	150386356	g/t	g	K
7730467	1655	5	150386455	t/c	t	Y
6579829	1692	5	150386492	a/c	a	M
6579830	1802	5	150386602	g/a	g	R
6579831	2061	5	150386861	t/a	a	W
6896232	2112	5	150386912	t/a	t	W
1351131	2153	5	150386953	t/c	g	R
1038074	2667	5	150387467	c/t	g	R
1478396	3115	5	150387915	t/c	a	R
6880512	3186	5	150387986	g/a	a	R
4958858	5621	5	150390421	t/c	t	Y
4958431	5735	5	150390535	t/g	g	K

dbSNP	Position in SEQ ID NO:5	Chromosome	Chromosome Position	Alleles (A1/A2)	genome_letter	deduced_lupac
4958432	5829	5	150390629	g/c	g	S
6898463	6658	5	150391458	a/c	c	M
4958859	7901	5	150392701	g/c	c	S
4130064	11447	5	150396247	g/a	g	R
4130065	11466	5	150396266	a/g	a	R
4133119	11984	5	150396784	t/c	g	R
4958860	15803	5	150400603	t/g	t	K
4958861	16257	5	150401057	t/g	t	K
4437356	17604	5	150402404	c/a	c	M
4958868	19762	5	150404562	c/t	t	Y
1478400	22367	5	150407167	a/g	g	R
6889375	22709	5	150407509	a/g	g	R
1600159	23631	5	150408431	g/c	c	S
6875892	23686	5	150408486	t/a	t	W
4608909	25599	5	150410399	t/c	t	Y
2345000	26973	5	150411773	a/c	c	M
4516840	28457	5	150413257	g/t	t	K
2054440	28669	5	150413469	a/g	a	R
707141	29908	5	150414708	c/t	a	R
707142	30105	5	150414905	a/g	t	Y
841236	30711	5	150415511	a/g	a	R
707143	30851	5	150415651	g/a	t	Y
707144	31203	5	150416003	t/c	g	R
6869405	31446	5	150416246	a/c	c	M
707145	31638	5	150416438	c/t	g	R
707146	33084	5	150417864	c/t	g	R
707148	33958	5	150418758	c/a	t	K
707150	35182	5	150419982	a/t	t	W
5872184	38332	5	150423132	a/ac	a	N
3763015	40875	5	150425675	g/a	c	Y
2042235	41624	5	150426424	t/c	t	Y
3763013	41671	5	150426471	a/g	c	Y
2042236	41825	5	150426625	g/a	g	R
1946234	42920	5	150427720	c/a	a	M
1946235	42935	5	150427735	t/c	t	Y
1946236	43001	5	150427801	t/a	a	W
8177402	43012	5	150427812	t/c	c	Y
8177403	43203	5	150428003	c/t	c	Y
8177404	43294	5	150428094	t/c	t	Y
8177405	43295	5	150428095	t/c	c	Y
8177406	43344	5	150428144	c/t	t	Y
8177407	43509	5	150428309	t/c	c	Y
8177408	43549	5	150428349	g/c	c	S
8177409	43560	5	150428360	t/a	a	W
6888961	43578	5	150428378	a/t	t	W

P A T E N T
Docket **SEQ-4095-PV**

dbSNP	Position in SEQ ID NO:5	Chromosome	Chromosome Position	Alleles (A1/A2)	genome_letter	deduced_iupac
8177410	43640	5	150428440	a/g	g	R
8177411	43792	5	150428592	g/c	g	S
8177412	43797	5	150428597	c/t	t	Y
8177413	43984	5	150428764	c/g	g	S
870407	44297	5	150429097	c/t	a	R
870408	44311	5	150429111	c/t	g	R
6873202	44588	5	150429388	a/g	a	R
8177414	44775	5	150429575	c/t	c	Y
8177415	44921	5	150429721	c/t	c	Y
3805435	45008	5	150429808	g/a	t	Y
8177416	45098	5	150429898	t/c	c	Y
3792799	45185	5	150429985	c/g	c	S
3792798	45475	5	150430275	t/c	g	R
3828599	45506	5	150430306	t/c	a	R
8177417	45543	5	150430343	g/c	g	S
3792797	45601	5	150430401	t/g	a	M
8177418	45652	5	150430452	t/c	c	Y
8177419	45758	5	150430558	ag/g	g	N
8177420	45826	5	150430626	t/c	t	Y
8177421	45974	5	150430774	c/g	g	S
4958872	46044	5	150430844	t/c	c	Y
3792796	46200	5	150431000	c/g	g	S
8177422	46218	5	150431018	a/g	a	R
8177423	46221	5	150431021	c/t	c	Y
4958434	46280	5	150431080	c/t	a	R
8177424	46330	5	150431138	-/gagtcctgg	gagtcctgg	N
8177425	46583	5	150431383	t/c	c	Y
8177426	46650	5	150431450	a/g	a	R
8177427	46721	5	150431521	a/g	a	R
8177429	46808	5	150431608	g/c	g	S
6889737	47242	5	150432042	c/a	c	M
3792795	47512	5	150432312	g/a	c	Y
8177430	47600	5	150432400	t/c	c	Y
8177431	47706	5	150432506	a/g	g	R
4958873	47808	5	150432608	a/g	a	R
8177432	47978	5	150432778	t/g	t	K
8177433	48021	5	150432821	t/c	c	Y
8177434	48025	5	150432825	g/a	a	R
8177435	48093	5	150432893	t/g	g	K
3763011	48413	5	150433213	t/c	g	R
8177436	48933	5	150433733	c/t	t	Y
8177437	49097	5	150433897	c/g	g	S
4958874	49105	5	150433905	t/c	t	Y
8177439	49570	5	150434370	g/a	g	R
8177440	49591	5	150434391	c/t	c	Y

P A T E N T
Docket SEQ-4095-PV

dbSNP	Position in SEQ ID NO:5	Chromosome	Chromosome Position	Alleles (A1/A2)	genome_letter	deduced_lupac
8177441	49704	5	150434504	g/c	g	S
8177442	49705	5	150434505	a/t	a	W
8177443	49798	5	150434598	c/t	c	Y
869975	50082	5	150434882	a/g	g	R
869976	50147	5	150434947	g/a	a	R
8177444	50356	5	150435156	a/t	a	W
8177445	50725	5	150435525	t/c	t	Y
7721469	50968	5	150435768	c/a	a	M
8177446	51029	5	150435829	a/c	a	M
7704191	51086	5	150435886	t/c	t	Y
8177447	51166	5	150435966	t/c	t	Y
11548	51493	5	150436293	c/t	c	Y
2230303	51539	5	150436339	g/t	t	K
7722386	51562	5	150436362	g/a	a	R
8177448	51645	5	150436445	g/a	g	R
8177449	51649	5	150436449	t/c	c	Y
2070593	51650	5	150436450	t/c	g	R
8177450	51656	5	150436456	g/a	a	R
8177451	51657	5	150436457	t/c	c	Y
8177452	52009	5	150436809	g/a	a	R
8177453	52143	5	150436943	a/c	c	M
8177454	52349	5	150437149	g/c	g	S
3763010	52421	5	150437221	c/t	c	Y
8177455	52532	5	150437332	a/g	g	R
8177456	52682	5	150437482	a/g	g	R
736775	53058	5	150437858	t/c	t	Y
2277940	53187	5	150437987	t/c	t	Y
8177458	53377	5	150438177	g/a	g	R
8177834	53699	5	150438499	g/a	c	Y
3924	53845	5	150438645	a/g	g	R
2233312	53920	5	150438720	a/g	c	Y
2233311	53929	5	150438729	t/g	c	M
2233310	55473	5	150440273	t/c	g	R
2233309	55690	5	150440490	a/g	c	Y
4958875	55850	5	150440650	a/g	g	R
2233308	56761	5	150441561	c/t	g	R
2233307	56840	5	150441640	c/g	c	S
2233306	57000	5	150441800	c/t	g	R
2233305	57116	5	150441916	t/g	a	M
2233304	58419	5	150443219	t/g	c	M
2233303	58420	5	150443220	c/t	g	R
2233302	58808	5	150443608	g/c	c	S
2287719	58906	5	150443706	a/g	g	R
2287720	59048	5	150443848	c/t	c	Y
7727034	59187	5	150443987	c/g	c	S

dbSNP	Position in SEQ ID NO:5	Chromosome	Chromosome Position	Alleles (A1/A2)	genome_letter	deduced_iupac
7727250	59361	5	150444161	c/t	c	Y
7709800	61218	5	150446018	g/a	g	R
3840312	61700	5	150446500	ag/a	a	N
2287721	62290	5	150447090	g/a	g	R
6875293	62596	5	150447396	t/c	c	Y
3805434	64049	5	150448849	g/c	g	S
2080982	66077	5	150450877	g/t	t	K
2080983	66079	5	150450879	g/t	g	K
2287722	66086	5	150450886	t/c	c	Y
2233301	66115	5	150450915	t/g	c	M
2233300	66150	5	150450950	c/g	c	S
4958876	66475	5	150451275	c/a	a	M
2233299	69177	5	150453977	a/g	g	R
2233298	69210	5	150454010	a/g	c	Y
2287723	69312	5	150454112	t/g	t	K
2161359	70244	5	150455044	a/g	g	R
7734456	70882	5	150455682	g/c	g	S
4292439	71905	5	150456705	t/c	c	Y
4958878	72294	5	150457094	a/t	a	W
6862024	72581	5	150457381	a/g	g	R
3834819	72786	5	150457589	-/ca	ca	N
2233297	72950	5	150457750	g/a	t	Y
2233296	73106	5	150457906	g/a	c	Y
2233295	73162	5	150457962	t/c	g	R
2233294	73273	5	150458073	g/t	a	M
7713028	74131	5	150458931	g/a	g	R
7713223	74406	5	150459206	t/c	c	Y
7713567	74665	5	150459465	c/t	c	Y
888889	74740	5	150459540	t/c	c	Y
2233293	75382	5	150460182	a/g	c	Y
3749657	75400	5	150460200	g/t	c	M
2233292	75460	5	150460260	g/a	c	Y
2112635	75863	5	150460663	c/t	c	Y
871269	76098	5	150460898	t/c	c	Y
3792794	78432	5	150463232	a/g	c	Y
6579837	78604	5	150463404	g/t	g	K
3805433	79190	5	150463990	c/g	c	S
5872186	79870	5	150464670	-/a	a	N
2233291	79928	5	150464728	g/c	c	S
2233290	80213	5	150465013	g/c	g	S
2233289	80227	5	150465027	c/t	g	R
4958435	81994	5	150466794	t/g	g	K
4958880	82187	5	150466987	c/a	c	M
1422673	82698	5	150467498	t/c	c	Y
2042234	82841	5	150467641	a/g	a	R

dbSNP	Position in SEQ ID NO:5	Chromosome	Chromosome Position	Alleles (A1/A2)	genome_letter	deduced_lupac
3805432	83214	5	150468014	a/g	c	Y
3805431	83249	5	150468049	t/c	g	R
2233288	83485	5	150468285	t/c	g	R
2233287	83807	5	150468607	c/t	g	R
3815720	83907	5	150468707	g/a	g	R
3792792	84216	5	150469016	a/g	t	Y
3792791	84656	5	150469456	a/g	c	Y
2303018	85448	5	150470248	g/a	g	R
3792790	85881	5	150470681	g/t	a	M
4958436	86539	5	150471339	t/c	t	Y
2233286	86796	5	150471596	t/c	g	R
2233285	87057	5	150471857	g/a	c	Y
7732451	87922	5	150472722	t/c	a	R
2233284	88098	5	150472898	t/c	g	R
1422674	89319	5	150474119	g/t	t	K
3792789	89678	5	150474478	c/t	g	R
4562032	90026	5	150474826	c/a	c	M
6885077	90033	5	150474833	g/a	g	R
1559126	90114	5	150474914	c/g	c	S
3792788	90326	5	150475126	t/c	g	R
1559127	90463	5	150475263	t/c	t	Y
3792786	90548	5	150475348	a/g	t	Y
6880110	90800	5	150475600	a/g	a	R
6861227	90838	5	150475638	g/t	t	K
3805430	91400	5	150476200	c/g	c	S
1862384	92086	5	150476886	a/g	a	R
4958881	93946	5	150478746	t/c	t	Y
3792785	95360	5	150480160	a/g	t	Y
6889605	96576	5	150481376	a/c	a	M
6870205	96721	5	150481521	a/g	g	R
4248047	98316	5	150483116	t/a	t	W
4958882	98497	5	150483297	c/g	c	S
3792784	99382	5	150484182	c/t	a	R
3792783	99442	5	150484242	t/c	a	R
5872188	99764	5	150484565	-/ag	ag	N

Assay for Verifying and Allelotyping SNPs

[0250] The methods used to verify and allelotype proximal SNPs of Table 24 are the same methods described in Examples 1 and 2 herein. The primers and probes used in these assays are provided in Table 25 and Table 26, respectively.

TABLE 25

DbSNP rs#	Forward PCR primer	Reverse PCR primer
1478398	TTCCCTCCCTTCCTTTCTTC	AAGATTACCCCACTGCACTC
1478397	CACATACTTGCTGAGGATC	AGCACTCAGAATACTACCTG
1160114	AGCTGGATTGAGAGCCTTG	TCTGCTATCACCTTGTTCCC
1160113	TCTGCTATCACCTTGTTCCC	AGCTGGATTGAGAGCCTTG
1382323	AGAAGGACAGTTGCAACAGG	GTTCTCATCCAGTCCTTAC
1160112	GTTCTCATCCAGTCCTTAC	AGAAGGACAGTTGCAACAGG
7709870	TTATGACTCATAACTTTTTG	CTTCTTGAAATGCTCAGGG
7710643	ATAAAGTCTGGGCTCAGATG	ATAGACCAGGGAAGTGAAG
7730467	TGTGGCATATCTTCTATTGC	AATGTGGCTGTTATGGTAGG
6579829	GGAGGCTTTTTCACATTCAC	AATGTGGCTGTTATGGTAGG
6579830	TGAGTATGGATTCTCAGGTG	ACCATAAGAGAGAAAAGCCC
6579831	GTGTGTGATGAATATGGGAG	TTTCTCTCTGTGTGTATTC
6896232	GTCACACCTCTTGTACATC	CACTGAAAGCTCTCTCACAC
1351131	AAGTGTGAGAGAGCTTTTCTCAG	GTATAAGGTTTCTCTCTAGTG
1038074	TCATATCTTGTGGGTTGTCC	TTCAGTGTGGACCACAAAGG
1478396	CATGGCCTCTTACAAGACTC	GGGTAATTGTACCCACCAAG
6880512	GAGGTATTGGTGATTAGGGC	TAAAAAGGAATCTTGGTGG
4958858	GCAAGTGAGATCTTGGTAGG	CAGACTGGCAGGAGTACATT
4958431	CAGAGGTGCACTTCAGGAA	CCATCTTGCTTCTTCCCTG
4958432	TGCCTTAATTCATGCAACCC	TTATATCCAGGGAAAGAAGC
6898463	CAAATCTACTTTTGAGTACC	GACTCATCAAATGGAGAATG
4958859	GTGGTATAACTCCTCAGAAG	ATGATGAAGTTGTCTTCAGG
4130064	AATTCCTCACATTAACCCAG	CCACAGCAAAGACAAAAGGG
4130065	CCACAGCAAAGACAAAAGGG	TCCTCACATTAACCCAGGAG
4133119	AGTGAGGTATAATGCCAGCC	AAAATCTCCCTGTGTCTGCC
4958860	TATGCGGTGGAGAAGAAAGG	TCAACCCGGACAACAAAACC
4958861	ACTGGGATTTTCTGGTGAAG	ATGGGTGAGTCTCCCTTTAC
4437356	AGGTTTCTGGGTTTCTCTC	ATGGTAGTGTGTTTCTTTCG
4958868	TTGTTGGCCTTGTTTCATGTC	CCTGTAATCCCTGCACTTTG
1478400	TGGACTCCTGTGGGATAATG	CAAGACTTCCAAGTGCATCC
6889375	TACCTGTCCACAGAAATAGC	CCTGAGACCCCTATGACTTTA
1600159	GGTTCATGTGATTTGGAAGC	TGACTCTCCTAGTTCCTCAG
6875892	GGGACTTCTCAGCTTCCAAA	AGGGTCTCCAGAGAAACAG
4608909	CTGATAGAGGTTTATCTCAGC	TCTAGCCAAACTCCTATGTG
2345000	TAACAAGCCCCCTAAGTAGTC	TCAGGTGAAACCAACTGAAG
4516840	GTGCAGTGGATCCTTTTCC	CTAGACTCTAGGTAGGACAC
2054440	CCCTTGAATGAGATGGAGAC	TGGGAAAGGAAGGGAATGTC
707141	ACAGTGCTAAGCACTTTCCC	ACAGTAGACACACAGGATAA
707142	AGCCTGGCTTCTTCGTCTAC	ATTTCCACCCTGGGCACTTC
841236	ATGTGTGCATGAGAGGAGAG	CCAAAAAGGAGGAATGTGGG
707143	CTTTTAAAGCCAGATGGACC	CCACCCTGTTCTTACTGTAG
707144	ACTGCACCAGACGCTTTCAC	TTGGGCAAGGCGTGTTCCT
6869405	TCTCTCATCATGGCTTGTGG	CTGGCCAAGCGATAACACTA
707145	TAAAGTCTGGGGAGGTCAGG	AGTGGCTGCTTTCGGAACAG
707146	GCAACAAGAGCGAAACTCTG	AAATGGGCAACATGGCAAAG
707148	ACCTTTCATATACAGCTGGG	CTGTGTTCCAGCATCATCTG

DbSNP rs#	Forward PCR primer	Reverse PCR primer
707150	ACTGATCTGGGCTAGGAATC	AAGGACAGCCAATTAACACG
5872184	TAAAAATGTTGTTTACCAGGG	AAGGATGCCTATGTGACCAG
3763015	GCCAAATATTGTTTTCTTG	ACATCGACCCTTTGTTGTAC
2042235	TCCTTCTCTGATCTCAGTTG	TTAGGAATGAAAAGCCACAG
3763013	AGAGACCTGAGATGCTACCC	ACAGGTGGACAACTGAGATC
2042236	AAAGGTGTTTCCAGCAGATA	AAAATGTAGAGAGATGCCCG
1946234	AACAAGTCATCTAGCCAGAG	CTGGCTTAGAAGCAGAAAAT
1946235	CCTGGCTTAGAAGCAGAAAA	GGCACTGGAGATCACTAATC
1946236	GCACTGGAGATCACTAATC	CAAACCACTGGCTTAGAAG
8177402	TATCTGTGGCCAAACCACT	CACAGGGAGCAAATTTATT
8177403	TTCTCTGAGTCTTTGGGTC	GCCTGTAGAAAAAGGTTAGC
8177404	ATTAGGACTGTAGGGACAGA	GCTAACCTTTTTCTACAGGC
8177405	ATTAGGACTGTAGGGACAGA	TTTTCTACAGGCATGTCAGC
8177406	ATGTCAGCTGTGATCCTTAT	GAAAACCCATTCTGGGTAG
8177407	TGATGGAAGTCTCCATTCTG	AATTTCCAGAGGACCATCGC
8177408	GGGCTAATAGCTCCCTAGAA	CGCCAGGTGTTTTTAAACC
8177409	ATGCTTCCCAGAATGGAGAC	TCCATTACAGCCAGGGCAAG
6888961	TCCTCTTTTGGCTCCAAAGT	TTCCATCAGTTCTAGGGAGC
8177410	TCCTTTTCGCACTTTGGAGCC	ATAAGCAAATCTGGGCAGAG
8177411	TGTGACCAATCCGCGGCCAA	TGAAATCCCAGCCGCTAGC
8177412	TGAAATCCCAGCCGCCTAG	TTTCAAGCCCTCGGGTGTGAC
8177413	TGCAGGCGTCTGCCTGCT	TCACTCACCTTCGACTTCTC
870407	GTGACATAGATGTAGCAAGG	AGAATGACTAAGGGAGGAAG
870406	CGGAGGTGACATAGATGTAG	AGAATGACTAAGGGAGGAAG
6873202	TAGAAATGGCCACTTGGATT	AGTGTCTGCACTGTCACTC
8177414	GGGATGCTTGGAGAAGCTGA	AATGAGGACAGTGGGTCCTG
8177415	CCTCAGTCTATTTCCAGCAG	ATAAGCATGCTGGGTCATCC
3805435	GACAGTATGTACTGGGGTGG	TTTGAGTCTATCCCTACACC
8177416	GAAGACCCAGAGGATTTTAG	AGGGATAGACTCAAAGCGAG
3792799	GGACAGAATTTTGGAAACGG	CTAAATCCTCTGGGTCTTC
3792798	ATTTTCCAGGTCAGGAATGG	CCAAAACCTGAAGGTTGGGAC
3828599	AGTCAGTCCCAACCTTCAGT	CAGGGCCCAATTGTATCTTC
8177417	AGTTATTCATGGAGTCCACG	TTTTGGAAGGGTCAAAGAAG
3792797	GAGTCCATTTATCCTTCCCC	ACGTGGACTCCATGAATAAC
8177418	AAGTCCTGACTGGTTGTATG	CTCAGAGAGAATAGGATGGG
8177419	ATGCCCATCTCTGCTCCCAA	TCCTAACCAGAGCTAAGAC
8177420	ATTCCATTCTCCACATGCCC	TAAGAGTTCAGATGTCTTAG
8177421	ATTGAAAGGGAGATGCTAGG	TTGTAGAGACAAGGAGCGTG
4958872	AGTCACCTAGAAACCAGCAG	ACAAAAGGACTGCAGAAGCC
3792796	CAATATGATGCTGTGAGAAG	ATCTTACAATGGAGGAGCTG
8177422	ATCTTACAATGGAGGAGCTG	TATGATGCTGTGAGAAGTGG
8177423	ATCTTACAATGGAGGAGCTG	TATGATGCTGTGAGAAGTGG
4958434	CTGCTGGTCTTGTGCTTTC	AGACCACTTCTCACAGCATC
8177424	GGCTTGAGAGTTGGATGATG	GGAGAGGAGAAAGACACAAG
8177425	AGAGCAAAACAGGCCTGGAG	ACCCATGGGCCACCTTCTGA
8177426	ATTTCGTTCCAAGAGACTCC	ATATGTCCAGGGAGATAAGC
8177427	TTATCTCCCTGGACATATGC	GGCAAGGAGAACCCTATTTTC
8177429	CAGGTTGTCCTAATAATGGG	ATGAAATAGGTTCTCCTTG

DbSNP rs#	Forward PCR primer	Reverse PCR primer
6889737	CATGACAGAGGCAGCTCTTC	TGAAGGGAGTGATATATGCT
3792795	GGCCACAAAGGACCTTAAAG	TGACACAATTTGGCAGGTGG
8177430	AGTAGGATGTGGCCTATGAG	ATTGTGTCAATGATGCAATG
8177431	CATGATCCTATCAAGCCATC	GACCTGAGTTTCCTCATTTA
4958873	GCCAGTCCAAGACCACACAG	TGGGAGACCTGGGCTCCAT
8177432	CCCGGAACATTAACACATGC	TTACCAAATAGGGAAGCAGG
8177433	GGACAGGAAAGATGAAGCTG	ATGCAGGTACTGTTGCTTTT
8177434	GGACAGGAAAGATGAAGCTG	ATGCAGGTACTGTTGCTTTT
8177435	ATTGGGAGCCTCTGAATCAC	GGCCAGTGTGAAGGAAAAAC
3763011	GTGCTTTTAAAGCACTTAAT	CTCCTAATTCCTTGTTTAAG
8177436	CACTGTGTCCGTGGTTTTG	CCTAGAACATGTCCAAAGGC
8177437	GAGATGGTAACTGAAGCTCC	TGCCAAGAGAAGCACCAAAG
4958874	TGCCAAGAGAAGCACCAAAG	GAGATGGTAACTGAAGCTCC
8177439	AGAGAAGCATCCCAGAAAAA	TCCATGCTCTGCCTGGCAAT
8177440	GCAATCACAGGCGAATTCCC	GCATCCCAGAAAAAGCACTC
8177441	TCCCCAGTTTCCTCAGTGTC	AACAGAGCAGAGTGCGTTTG
8177442	TCCCCAGTTTCCTCAGTGTC	AACAGAGCAGAGTGCGTTTG
8177443	TGCCAAAGATTATGGGAGGG	GAGCAAGAACTATCCATCCC
869975	CTTCTCGGGCCTCAGTAGT	CTGTCTCATCCACACCACTC
869976	AGTGCATTCACTTCTGGGCC	AGTGGTGTGGATGAGACAGG
8177444	AGGAGAGTAGTTCTTGGTGG	AGAAAGCTCCTCTCAGATGG
8177445	TTCTCTCCATTGACATCCCC	TCAACAGGTATGTCGACCA
7721469	ACTATTGTTCCAAGTAGAGG	ATGTTCACTCTGGGTCCCTC
8177446	AGTTTGGGAGTTAGAAGACT	CAGAAGGACCCAGAGTGAAC
7704191	TTCTTGGGGAATAGCCTGGCC	CGCTGGCAGTCTTCTAACTC
8177447	TGGGAGGACAGGAGTTCTAG	GCCTCAAGCAAGGTTGACAC
11548	TGTTTCAGGAAGAAATCCGTGT	GGGGCCTTGAGTGATAGGA
2230303	TGCCTGGCAGTACACAGAAC	ACTATCTACCCATCACAGAC
7722386	CCTGTAGGCATGTGTGTAAG	GCACAAATGGATGCATACAG
8177448	CAGATGGTACACATTCCCAG	GCCTACAGGTATGCGTGATT
8177449	CAGATGGTACACATTCCCAG	GCCTACAGGTATGCGTGATT
2070593	ACACATGCCCTACAGGTATGC	CAGATGGTACACATTCCCAG
8177450	CAGGCACACAGATGGTACAC	GCCTACAGGTATGCGTGATT
8177451	CAGGCACACAGATGGTACAC	GCCTACAGGTATGCGTGATT
8177452	TGGCCCTTGCTGTCACATCT	TACATCCCCACCCACAGTT
8177453	AGGGGTGGCATCCCTGCCCA	TGAGGGGCCAGCCCTTAGTG
8177454	TGCACCCACTGTAAAAAGT	AAGTGAGGAGGAGAAGGTGG
3763010	AGTGGGTGCAAAGGTAATTG	TGATCTCAGGGAGAATTGTG
8177455	ATGTAGCCCTATTAGGGGTG	AGCTAACTATCAGGTTGTTG
8177456	CCCGGGAGTTTGAGGCTATA	AGTGCAGTGGCTCTTCACAG
736775	TACTCTTGAGTAATGGTGAC	TGGCCTAGGCTCCTTCCACT
2277940	CGAATCATGGACATAAATCC	TCAGGGAAAGGAAGAAAAGG
8177458	ACAGTAGCCTTGCTGAAGCC	CAGCTTCAGGCTGGCGCCC
8177834	TCTTAGGATTGCTGCTCCTG	GAAAACTCCTTCCCTGCTG
3924	TCCCCAGTCTGTAAACAGC	GAGCCTCAGCTGGATGAGAG
2233312	ATTGTGTCATTGGCTCCAC	CACACCGTGCAAGTGGCTTC
2233311	TTGTGTCATTGGCTCCACC	CGTGCAAGTGGCTTCTAGTT
2233310	CACTGTTTTGGAAAGCTGGG	TTATCTGCCAGCATTGCCTG

DbSNP rs#	Forward PCR primer	Reverse PCR primer
2233309	ATTTAGTATTGTCCTGGCAC	TATTCGGCTGCGACAAAAC
4958875	GGGATAACTTGCTGAAGGTC	GCTTAAGAGATTGGCTCTGG
2233308	AGACACCTTCCAGAGAGGA	AGAGCCAGGCCCTGGACAC
2233307	TCTTCCATCTGGTGAGTCTG	TCCTCTCTGGAAGGTGTCTG
2233306	CCACCCAGAACATCTCTGC	ATGGTGTGGCACCATTGGCTG
2233305	CTAGCCTTCAGAGAGCTAAC	TCTGGCTTTGGCCTGCAACA
2233304	TGGCCCAGAGGGAAGCATCA	CCTGGATCCAGGGCCTAAC
2233303	TGGCCCAGAGGGAAGCATCA	CCTGGATCCAGGGCCTAAC
2233302	ACCAGGGCCCTCCAATCCAT	AAATGCCCAGGTAAGAGTGA
2287719	CTGCAGCTTCTCCACTTGCT	TCGTGAGCGCATGAATGAGG
2287720	AGGGAGGGTGAAGAGAGGGA	ATCTGTGACCCAGCAGGAG
7727034	AGAGTAGTTCTGTGCCCTC	TGGTTGATGGCTTTCAACGT
7727250	TTGGATCTGCTGGTTCTGAG	ATGTGAACTACAGGCTAAG
7709800	TTGCTCATGACCTAGGCATC	CTTTATCTTCTACTCCACC
3840312	GAAATGTGCTGGAAGCAGG	CCTCTCCAGTTCAGTTTTGC
2287721	CCTTGAGTCCAGCTGCAATG	GGGTTACCCTTCCTAAGCTG
6875293	ATGGACATTACTGTACCGAC	TGGCCCAGCCCTTACGTTCT
3805434	AAATAAGGCCCTTGGTGTCC	GGGCATGGTCTTTTGCCCTAG
2080982	CTGCCTCTTTAGCAGCTTTG	AACCTCTCCTCTGGGCCATA
2080983	CTGCCTCTTTAGCAGCTTTG	AACCTCTCCTCTGGGCCATA
2287722	CTGCCTCTTTAGCAGCTTTG	AACCTCTCCTCTGGGCCATA
2233301	CACAGGGCATGCCTGGTCTT	CCACTCCCCAAGGTTCAAAG
2233300	TGAACAAGCAGTGGGACCAG	AAGACCAGGCATGCCCTGTG
4958876	TTTACCTTGCCAGGAAAGC	CAAAGAGGTGTGTGTGTCC
2233299	CCAGCATCTTCACCTTCTTC	TTTTGGTGAAGGCTCCTCTG
2233298	TTTTGGTGAAGGCTCCTCTG	AGCATCTTCACCTTCTTCTC
2287723	AATTATCTACCCAGTCTCG	TGGGAGGAATAGGGAGACAG
2161359	ACAGCTCTTCCTTACAAAAG	TTAGTGACCATTGGTGGATC
7734456	AATAGTCTAGAGAGTTCCCC	CCTGGGTTCTATAAGATGTTG
4292439	CCCTGGACAGGTCTCTTAC	AGGAAGAGCATCTGGCTCGG
4958878	AGAGTTTACCCAGGACATGC	TAGAATGGAATACTAGTCCC
6862024	GTGCTGGGACTAGAGGATAG	TGTTGGCTAGTGTCTGTGTG
3834819	TGGGAACCACTCTCTAAGAC	GTGTTGAGTCGTTTGCTCAG
2233297	ATGAAGCCACAGTGACTACC	GTGGTAGAAGGTTCTAGCTG
2233296	AACCAAGGATGCTACAGAAG	ATGGAAGGGACAGGCAAGAA
2233295	TTGCCTGTCCCTTCCATCTT	ATCCCAGGGAGGAAAATTTG
2233294	TGGGATGGAGGTAAACAGAG	CAACTCATGCGATAGTGAGC
7713028	CTGGTGAAATACATCACCAC	TTGAGTAGCTGGGACTACAG
7713223	CTTTTGGATGGCCAAGGATG	CCAGCTTCAGTTTCTGAATC
7713567	AGCTGGTACCCACCAGATGA	ATCCTGTGAGTGGCCACAATT
888989	CAGGGACTTGATTGGAGTCT	ACTCACAGGATGGAGAGCAA
2233293	TCAGAGAAGGGGTGAGGAGT	AACCCAGAAATCAGTGCTGC
3749857	AGAAATCAGTGCTGCACACC	TAAGTTCAGGCCCTCAGAGA
2233292	TGAACTTACCGCAGCCTCTC	CCAAGTTGGATAAGGGCCTG
2112635	TCCATCCCTTCTCCTTCAT	GGACTTCTCTGAGGAGATGG
871269	TTCCACAACTTTGAGCTGG	TAATTAATTCCTGAGCTCCC
3792794	TCTGCTAGAAGGTAAGCTTG	AGTGTGTATGAAGTGCCACG
6579837	ATAGATCCTAGGCCCTTAAA	AGGAAATAACAAGGAGGGG

DbSNP rs#	Forward PCR primer	Reverse PCR primer
3805433	CTTAGCCTTGTGGGCTTTAG	AAGCCTCCGTTTTGCCATCT
5872186	TCCCGTATTTCCCATTTCC	GCTTTTTGTTGAGGGTGATG
2233291	CCTTATCCTGTTTCATCACCC	AATCCACTGGTACCATGGGG
2233290	CTGCAGGTGCAGCATCAGG	TACTCAGGCCTTGGTGAAGA
2233289	TCAGGCCTTGGTGAAGAGTG	ATCAGGTTGCCGTCTCAC
4958435	AAGTTCTGCTCATCCTTCCC	GATCTCTGAGGCTCCCTGTA
4958880	TCTGGAGGAATGGCAATGAC	ATTCCTCTTGTTAGAATGC
1422673	ATGCTTGTGTTCACTGGTTG	CATGCTAGTTAGCCAGACAG
2042234	GCACCTATTGCTCGCATAAC	TCTACCTTCTCCATTCTCCC
3805432	AAGGCCAGGGCCCTGTAAGA	AACCTCCTTCCTGTGCTCC
3805431	AAATCACCTGTCTTACAGGG	TTTGGGTCTGTGGGCTTCCA
2233288	ATATGTGAGCGAGAAGCACC	ACAGAACCTGTTTCAATCCC
2233287	ATGACAGGCTTGTGAGAAAT	TTTTGAGTACACAGGGACCG
3815720	TGCTGGTTCAAGGTCAGCTA	TAATGTGAGGTCATATCCCC
3792792	TTCTCAGATCAGTTCACTCC	AACACAGATGGCAGCTGTTAC
3792791	GATTGCATAGTTCAGCATCC	CATTACCCGTGTAACCTCAG
2303018	CAAATGTCACAGCATCTCCC	TAAAACTTACACTGGATGGA
3792790	CATAAAAGCCCCATATCCCC	AGGGAGGGCCAAAGTCTCAGT
4958436	GCCTTGGGGTCTTTATCAGC	ATATGCCAGCTCCAAGTGAC
2233286	ATGAATGGAAGGGTAGCCTG	ATCCTTCACAGTGAAGTCCC
2233285	TTCCAAAAGCTCCCCTAGAG	ACGGGGAGAAGCAGCACAC
7732451	CATCTCTCGTGCCCCAGAAA	GCTGGAAGGCCAGTTAATG
2233284	TACATGGTGCATAGAGACAG	ATATGCCTCTGCCCAAGTCA
1422674	TGCTGATAATTCTCAGCAC	GTCCATTCACTCATCCATTC
3792789	GAGGATTCTGATGAAACAG	TTCAGTGGGGACCTCAGAAG
4562032	ATTTTACAAGGGAGAACTG	CTGACTTTGCATCTTGCTC
6865077	CTGACTTTGCATCTTGCTC	ATTTTACAAGGGAGAACTG
1559126	CACCATACTCACACAGCCAG	ATGGTGCTGCCCTACAAAGA
3792788	CCCTTCTCCCAAGACTGAC	AGTGTGGGTAGCTGTCCTTT
1559127	ACTGTTTCTTAGTTCGGTGG	GGTGACTTGTTTTTAACCTG
3792786	TGAGGACAGAGGCAAGCAGA	AACAGTGTGGGGGCTGCACTT
6880110	TCAAGAACAGTGAAACAGAG	TGGTGGACAAGAACCAGGAC
6861227	CATGCCCTCATGTGGTGTG	AGCAGTGTCTGGTCTTGT
3805430	TCCAGAGAGGGTTTTCCAC	GGGAGAAAGAAAGGCAGTGG
1862364	AATCCCATGGCACACCACAG	TGTAGTTTGTGGAACCAGGC
4958881	GGACTGGAGGTCATCATAAC	TTCCACCCAAGGATGAAAGG
3792785	TTTGTCTTACCACTAACCAG	CTACATGGATGAGGAAGCAG
6869605	TTTGTCCAGCTTCTGTGTAC	AGGTGTGAGTTACCTAAGGG
6870205	GAATCATCAAGAAGGGACTG	ACCCATTCTTTTGTATGGC
4246047	AAGCTGGTCTCAAACTCCTG	TGTTATTTAGGCTGAGCGTG
4958882	TTGTTGGTGGCTGATGAAGG	GCTCACTCATCTGGTTAAG
3792784	ATGATTTTCCCATGACTGGC	AAACAGCCAGCTGCTGCTCA
3792783	AATCTGAAGAGTGACTGTCC	AAAGACCTTGGCGGCCACCAT
5872188	CCTTGGCCGACTTTGGTTTC	AGACTTGGAAGAGAATGCCC

TABLE 26

dbSNP rs#	Extend Primer	Term Mix
1478398	TGAGACAGGGCCTCACTCT	ACT
1478397	GTCTGAGGATCAGTAATAATAC	ACT
1160114	CTTAATTGCAATGCCTCTT	ACT
1160113	CTTGTTCCCTACCTAGC	ACT
1382323	CTGACCAGGGTAACAAC	ACT
1160112	TCTCCAATCACCGTTGT	ACG
7709870	CCTACAAGAAATATCAAGGC	ACG
7710643	GAGCATTACAGTTGTCAC	CGT
7730467	TTGCCACTAAATAAATCCAA	ACT
6579829	CATTCACTATGCTCTTTTTT	ACT
6579830	ATTCCTGCTGAAGGT	ACG
6579831	AATATGGGAGAGCCTTC	CGT
6896232	AATACACACAGGAGAGAAA	CGT
1351131	GAGAGCTTTCAGTGAAGT	ACT
1038074	GTGGGTTGTCCACATAT	ACG
1478396	CAAGACTCACTGCAATTTA	ACT
6880512	GGGCTTCAACATATGAAT	ACG
4958858	GAAGATGAAGGCCTGAG	ACT
4958431	CTTCAGGAAAATCCGGC	ACT
4958432	AAATACAGTCAGCCCCC	ACT
6898463	CTTCATTTAGGTATTCTACT	ACT
4958859	TCAGAAGAGGAGAGCAC	ACT
4130084	CCTTCCAAAATTTCCCT	ACG
4130065	GGGAAATTTTGAAGGT	ACT
4133119	GCCAAGTATCCTGTATCAA	ACT
4958860	AGGGCAACAATAAGGGA	ACT
4958861	AAGGAGCAGAAGCATGA	ACT
4437356	CTGAGCAGCCCTAGTGA	CGT
4958868	CTCCTGACCTCGTGATC	ACG
1478400	TGGGTGAAAAAATTGGTA	ACT
6889375	CTGCTGATGATGTAGGAAT	ACT
1600159	GAAGCTGAGAAGTCCCG	ACT
6875892	CCAATTCATTATAGGAAATTTTT	CGT
4608909	GGTTTATCTCAGCATTGTTTAT	ACT
2345000	CTAGTCTCCTTGTCTCTTA	ACT
4518840	TCCTTTTCCACCTTGC	CGT
2054440	GTAAACATCCAAAAGCATTTTC	ACT
707141	ACATCCTGAGATGAAGG	ACG
707142	CAGGCAGCAGCAGCACA	ACT
841236	ACCTTCTCTGAGGGTATTCTA	ACT
707143	CCCTTAGAGGTCATCTGGTC	ACG
707144	CCATACAAAATCCCCCTTG	ACT
6869405	TGACTGGGACCCAGGCT	ACT
707145	GGCCCAGCAGCCAGAAG	ACG

dbSNP rs#	Extend Primer	Term Mix
707146	GAAAAGAAAGGCTAAGTGA	ACG
707148	ACTGAGGCCCAGAGAGG	CGT
707150	GTCTGCGCCACCTTCCC	CGT
5872184	GGAGACTCAATGCCAGG	ACT
3763015	CTGTGCTGGTGGTGGTG	ACG
2042235	ATCTCAGTTGTCCACCT	ACT
3763013	TACCCCTGGATTGCTAC	ACT
2042236	AGGCACCTAGGGTCACA	ACG
1946234	CACTGGAGATCACTAATC	CGT
1946235	CCTCAGTTTCCTCAGCT	ACT
1946236	ACACAGGGAGCAAATTT	CGT
8177402	CCAAACCACCTGGCTTA	ACT
8177403	GTCTTTGGGTCTTCATTT	ACG
8177404	TCCTCCCCATCATAAGG	ACT
8177405	TCCTCCCCATCATAAG	ACT
8177406	CTCTGTCCCTACAGTCC	ACG
8177407	GCATTTCTTATTCCTATCGAG	ACT
8177408	GCTCCCTAGAACTGATG	ACT
8177409	GAGACTTCCATCAGTTCT	CGT
6888961	CCATTACAGCCAGGGCA	CGT
8177410	CTTTGGAGCCAAAAGAG	ACT
8177411	GCGGCCAAGCCGAGACC	ACT
8177412	GATTGGCTGCAAGGGTC	ACG
8177413	TCCTGCCTGCTTCCCT	ACT
870407	GACCCTCGAGGTGGCAG	ACG
870408	AGATGTAGCAAGGCGAC	ACG
6873202	CAGAGATCTGTGCTAGAA	ACT
8177414	TGTTCTCTGAAATTTCCCTC	ACG
8177415	AGCAGGTGTGTGGCCCA	ACG
3805435	TACTGGGGTGGGCTCTG	ACG
8177416	TGCATGTTGGGAAGTTG	ACT
3792799	CGGAATCCTAGACTCATAA	ACT
3792798	ATAGACAGGCCAGCACC	ACT
3828599	CAACCTTCAGTTTGGAA	ACT
8177417	ACGTTCTCCCCACTAGC	ACT
3792797	ATCCTTCCCCAGAGTGC	ACT
8177418	CTCACCCCTAAAACCTTTCTA	ACT
8177419	CTGCTCCCAAGTTCTTA	ACT
8177420	ACATGCCCCATAACCCT	ACT
8177421	TCCCCAGTCCAACCTCA	ACT
4958872	GCAGTTACTAGGATCCC	ACT
3792796	TTGCTGTGTCTCTGATG	ACT
8177422	CATCAGAGACACAGCAA	ACT
8177423	CAGAGACACAGCAAAGC	ACG
4958434	TCTCCTCTCCCGTCTTAT	ACG
8177424	TGGATGATGGGACTCAG	ACG

dbSNP rs#	Extend Primer	Term Mix
8177425	GAACGAAATCTCATGTCAA	ACT
8177426	AGCAGATCCCACAACC	ACT
8177427	GACTTGCTCAGGGCCAC	ACT
8177429	CCTAATAATGGGAACCTGTAAA	ACT
6889737	GGCAGCTCTTCTGCACT	CGT
3792795	TTCAAGGTTTCTCCTTTC	ACG
8177430	ATGAGCCTACTCTGCCC	ACT
8177431	CATGGTTGACCTGGTTG	ACT
4958873	ACAGGGAGTTAATGGCA	ACT
8177432	TGTTGCTTTTCCCTACC	ACT
8177433	GCTGTTGTTACCAAATAGG	ACT
8177434	GAAGCTGTTGTTACCAAA	ACG
8177435	GAATCACCATGTCCATAC	ACT
3763011	AAGCACTTAATATTAAGTACCC	ACT
8177436	TGTGAAGATGATTATATAAGCC	ACG
8177437	AAGCTCCATCTTGCTGA	ACT
4958874	TGGGGCTGAGGGAAAAT	ACT
8177439	TTTCACTTCCGGGAATT	ACG
8177440	TCCCGGAAGTGAAAGGA	ACG
8177441	TCAGTGTCCCCTGGTCT	ACT
8177442	CTCAGTGTCCCCTGGTC	CGT
8177443	GAGGGTTGTAACCTCAC	ACG
869975	GGGCCTCAGTAGTTCAGC	ACT
869976	CCAAAGAGAAAGAGCAGA	ACG
8177444	GATAAATGTCCACCATGA	CGT
8177445	CTGGAAATTAGGGACAA	ACT
7721469	ACCCTGACTAGGGTCTC	CGT
8177446	GCTGTGGCTCTAGAAGA	ACT
7704191	ATAGCCTGGCCCTGAGA	ACT
8177447	AGTTCTAGAGCAGGGAT	ACT
11548	CACACTATCTACCCATCA	ACG
2230303	GTACACAGAACTGTATGC	CGT
7722386	ACCCACACCCACATGCC	ACG
8177448	CATAGGTAGACACGTGG	ACG
8177449	AAGACACATAGGTAGACAC	ACT
2070593	GCATGGGTGTACAGCCAC	ACT
8177450	CCAGAAAGACACATAGG	ACG
8177451	CCCAGAAAGACACATAG	ACT
8177452	TGTCACATCTGCCTTGG	ACG
8177453	CCTGCCCAGGGGCCTTA	ACT
8177454	TCTTTTCTCATCCTCCC	ACT
3763010	AAAGGTAATTGCGGTTTT	ACG
8177455	GGTGGCATCTTCATGAG	ACT
8177456	TGAGGCTATAGTGTGCC	ACT
736775	TCCCTGAGGGTAGGGCA	ACT
2277940	CATGTTCATTTATGCGCT	ACT
8177458	GCCATGCCAGCCACGTC	ACG

dbSNP rs#	Extend Primer	Term Mix
8177834	CCTGGAGGCTTCTGCAA	ACG
3924	CTCAGTTCAGGGACTGGT	ACT
2233312	TGATCTCAGATTGCCAA	ACT
2233311	CAGAGCCAGCTGATCTCA	ACT
2233310	CCAAGAGCAGAACTAAC	ACT
2233309	TGCTATTGTAATTTTGGGT	ACT
4958875	CTGAAGGTCATCTAGCAA	ACT
2233308	CTTCTGAACATAACAGCAC	ACG
2233307	GCTCCAGGGCACACACA	ACT
2233306	CTACCCCTACGCCTACC	ACG
2233305	GATGAGATGGGTGTCCT	ACT
2233304	TCAGCCGGTCAGTCCTC	ACT
2233303	ATCAGCCGGTCAGTCCT	ACG
2233302	TCCATGCCCCCTCTCCC	ACT
2287719	CTCCACTTGCTTCTTCA	ACT
2287720	TTCTCCTCAGGCCCAAGA	ACG
7727034	ACATTCTGGGCTTCAAG	ACT
7727250	AGAGACCCTACAACTC	ACG
7709800	CCTAGGCATCTCCCTGT	ACG
3840312	CTAGAGCCGTTCCCAAC	CGT
2287721	CCCATCACTGGCACCCC	ACG
6875293	GAGCATTGTGAAGTGATG	ACT
3805434	TGCTGACGGGAGGAACT	ACT
2080982	AACCTTGGGGAGTGGCC	CGT
2080983	TGAACCTTGGGGAGTGG	CGT
2287722	GCAGCTTTGAACCTTGG	ACT
2233301	TGCCTGGTCTTCATCTC	ACT
2233300	GGTAATGTGGGGTTCCT	ACT
4958876	CTAAGACATGGAACTACAT	CGT
2233299	TCACCTTCTCTCGGCTGC	ACT
2233298	CCCCAGGCTAGTGTGAC	ACT
2287723	AAGACCCCTCACCCAAG	ACT
2161359	CATTCCATTACTACAGTAATAACT	ACT
7734456	CCCTTCCTTTACTTCCC	ACT
4292439	CCCTTTAATCTCCACTC	ACT
4958878	CAGGACATGCAAATCTATT	CGT
6862024	CTAGAGGATAGGGGAGT	ACT
3834819	CTTGACAACTGGAATGT	ACT
2233297	ATGGAGGTCAGGCCAAG	ACG
2233296	ACATACCTGCTGCTGTC	ACG
2233295	AGCCTGGCCGCCAGAC	ACT
2233294	CCCTGAGTTAAGAAACCT	CGT
7713028	TACATCACCACCCCTCC	ACG
7713223	GGGGTTTTATAGCCCTA	ACT
7713567	ACCAGATGACTCATCAC	ACG
888989	GATTGGAGTCTTACAACA	ACT
2233293	GGGGCTGCAGGAGGAGG	ACT

dbSNP rs#	Extend Primer	Term Mix
3749657	CCTCCTCCTGCAGCCCC	CGT
2233292	TCTCGGCAGCCTGATCC	ACG
2112635	CCCCAGCTGACTTCTAC	ACG
871269	CTGGCAGTGAACAAGAG	ACT
3792794	TGTTGTATTCACTGTTGC	ACT
6579837	AGGGGTCCTGCCAACCT	CGT
3805433	TGGGCTTTAGCAGCGGG	ACT
5872186	CCTCATCCCTCCCCACA	CGT
2233291	GTCTGCCCACAACACAG	ACT
2233290	GTTGCCGTCTCACGGG	ACT
2233289	CCCTTTCCTCTCCAGG	ACG
4958435	ATGGGAATCACAGGACA	ACT
4958880	GAATGGCAATGACTATAACC	CGT
1422673	TGTCAGTGCCCACTGCA	ACT
2042234	CTCGCATAACAACAATTAAAG	ACT
3805432	CCTGTAAGACAGGTGATTT	ACT
3805431	GGGCCCTGGGCCTTCCT	ACT
2233288	CCCCAAGTGACTCCAGG	ACT
2233287	AATCCTGCTTTGTGATCT	ACG
3815720	AAGGTCAGCTAGTCCCA	ACG
3792792	GGGAAGGCCAGCACAGG	ACT
3792791	AGGTGCAGGGAAAGAAG	ACT
2303018	CAGCATCTCCACAGCC	ACG
3792790	GCTTGGGAAGGTCATCA	CGT
4958436	TGTGTGCCAGGCATCGC	ACT
2233286	GATAAACGAGAGAATGTGG	ACT
2233285	GGAAGCAAAGCATTACT	ACG
7732451	GTGCCCCAGAAAGAGGAG	ACT
2233284	GTGAGGCAGGAGCCAGC	ACT
1422674	CACCCAGACTGGTGCCT	CGT
3792789	CCTTGGGAGGAAGGTGC	ACG
4562032	TAACTCAGCCACGATGA	CGT
6865077	GCATCTTGGCTCTTATTG	ACG
1559126	ACAGCCAGGACACAGAG	ACT
3792788	CAGATACAAGATGAATACACC	ACT
1559127	TCGGTGGAAACATCTGC	ACT
3792786	GACCCCAATGTCTGCC	ACT
6880110	GCCACCTTGCATGACAA	ACT
6861227	GAGTCCATTTAGGGTG	CGT
3805430	CAATAGGATATTTCTCCTGC	ACT
1862364	CCCCACCACATCTTCTC	ACT
4958881	GCAATGTGATATCATGGC	ACT
3792785	TCTCAGGCAAATGACTT	ACT
6869605	CTCTAGATTCTAGATAGGG	ACT
6870205	ACAAACCACCATTCATT	ACT
4246047	TGCTCTGCCTCCCAAAG	CGT
4958882	TGATGAAGGAGAAATTTCAA	ACT

dbSNP rs#	Extend Primer	Term Mix
3792784	TCACTCTTCAGATTGGAA	ACG
3792783	AAATCATCAAGAACTTCCC	ACT
5872188	GAATGAAAATGTTTCACTCT	ACT

Genetic Analysis

[0251] Allelotyping results are shown for female cases and controls in Table 27. The allele frequency for the A2 allele is noted in the fifth and sixth columns for control pools and case pools, respectively, where “AF” is allele frequency. Some SNPs do not have an allele frequency disclosed because of failed assays.

TABLE 27

dbSNP rs#	Position in SEQ ID NO: 5	Chromo-some Position	A1/A2 Allele	Control AF (High BMD)	Case AF (Low BMD)	p-Value	OR	Low BMD Associated Allele
1478398	231	150385031	A/G	A=0.28 G=0.72	A=0.34 G=0.66	0.0334	1.31	A
1478397	330	150385130	T/C	T=0.61 C=0.39	T=0.67 C=0.33	0.0621	1.29	T
1160114	582	150385382	G/C	G=0.96 C=0.04	G=0.92 C=0.08	0.0034	0.44	C
1160113	589	150385389	A/G	A=0.96 G=0.04	A=0.93 G=0.07	0.0169	0.51	G
1382323	1060	150385860	A/G	A=0.67 G=0.33	A=0.63 G=0.37	0.1288	0.83	G
1160112	1066	150385866	G/A	G=0.91 A=0.09	G=0.85 A=0.15	0.0025	0.57	A
7709870	1311	150386111	G/A	G=0.11 A=0.89	G=0.12 A=0.88	0.5796	1.11	G
7710643	1556	150386356	G/T	G=0.87 T=0.13	G=0.86 T=0.14	0.7100	0.93	T
7730467	1655	150386455	T/C	T=1.00 C=0.00	T=1.00 C=0.00			
6579829	1692	150386492	A/C	A=0.92 C=0.08	A=0.89 C=0.11	0.1423	0.74	C
6579830	1802	150386602	G/A	G=0.91 A=0.09	G=0.89 A=0.11	0.4377	0.86	A
6579831	2081	150386861	T/A	T=0.31 A=0.69	T=0.32 A=0.68	0.7948	1.04	T
6896232	2112	150386912	T/A	T=0.90 A=0.10	T=0.89 A=0.11	0.7880	0.94	A
1351131	2153	150386953	T/C	T=0.51	T=0.49	0.4152	0.91	C

dbSNP rs#	Position in SEQ ID NO: 5	Chromo-some Position	A1/A2 Allele	Control AF (High BMD)	Case AF (Low BMD)	p-Value	OR	Low BMD Associated Allele
				C=0.49	C=0.51			
1038074	2667	150387467	C/T	C=0.23 T=0.77	C=0.27 T=0.73	0.1062	1.25	C
1478396	3115	150387915	T/C	T=0.92 C=0.08	T=0.90 C=0.10	0.1123	0.71	C

6880512	3186	150387986	G/A	G=0.64 A=0.36	G=0.60 A=0.40	0.2313	0.86	A
4958858	5621	150390421	T/C	T=0.06 C=0.94	T=0.13 C=0.87	~0.00001	2.54	T
4958431	5735	150390535	T/G	T=0.98 G=0.02	T=0.95 G=0.05	0.0132	0.44	G
4958432	5829	150390629	G/C	G=0.86 C=0.14	G=0.85 C=0.15	0.4357	0.87	C
6898463	6658	150391458	A/C	A=0.86 C=0.14	A=0.82 C=0.18	0.0341	0.71	C
4958859	7901	150392701	G/C	G=0.95 C=0.05	G=0.90 C=0.10	0.0030	0.48	C
4130064	11447	150396247	G/A	G=0.26 A=0.74	G=0.30 A=0.70	0.1514	1.21	G
4130065	11466	150396266	A/G	A=0.16 G=0.84	A= G=			
4133119	11984	150396784	T/C	T=0.95 C=0.05	T=0.94 C=0.06	0.2216	0.72	C
4958860	15803	150400603	T/G	T=0.10 G=0.90	T=0.17 G=0.83	0.0163	1.88	T
4958861	16257	150401057	T/G	T=0.13 G=0.87	T=0.17 G=0.83	0.0581	1.38	T
4437356	17604	150402404	C/A	C=0.10 A=0.90	C= A=			
4958868	19762	150404562	C/T	C=0.55 T=0.45	C=0.53 T=0.47	0.6623	0.94	T
1478400	22367	150407167	A/G	A=0.96 G=0.04	A=0.94 G=0.06	0.0584	0.57	G
6889375	22709	150407509	A/G	A=0.59 G=0.41	A=0.61 G=0.39	0.5378	1.09	A
1600159	23831	150408431	G/C	G=0.62 C=0.38	G=0.61 C=0.39	0.7340	0.96	C
6875892	23886	150408486	T/A	T=1.00 A=0.00	T=1.00 A=0.00			
4608909	25599	150410399	T/C	T=0.98 C=0.02	T=0.92 C=0.08	0.0008	0.27	C
2345000	26973	150411773	A/C	A=0.57	A=0.55	0.5708	0.93	C

dbSNP rs#	Position in SEQ ID NO: 5	Chromo-some Position	A1/A2 Allele	Control AF (High BMD)	Case AF (Low BMD)	p-Value	OR	Low BMD Associated Allele
				C=0.43	C=0.45			
4516840	28457	150413257	G/T	G=0.00 T=1.00	G=0.00 T=1.00			
2054440	28669	150413469	A/G	A=0.62 G=0.38	A=0.66 G=0.34	0.1835	1.18	A
707141	29908	150414708	C/T	C=0.45 T=0.55	C=0.46 T=0.54	0.6490	1.06	C
707142	30105	150414905	A/G	A=0.54 G=0.46	A=0.53 G=0.47	0.7349	0.96	G
841236	30711	150415511	A/G	A=0.55 G=0.45	A=0.54 G=0.46	0.7731	0.97	G
707143	30851	150415651	G/A	G=0.64 A=0.36	G=0.66 A=0.34	0.6049	1.07	G
707144	31203	150416003	T/C	T=0.69 C=0.31	T=0.75 C=0.25	0.0163	1.38	T
6869405	31446	150416246	A/C	A=0.08 C=0.92	A=0.09 C=0.91	0.5734	1.13	A
707145	31638	150416438	C/T	C=0.62 T=0.38	C=0.61 T=0.39	0.8223	0.97	T
707146	33064	150417864	C/T	C=0.53 T=0.47	C=0.48 T=0.52	0.1214	0.83	T
707148	33958	150418758	C/A	C=0.46 A=0.54	C=0.48 A=0.52	0.6249	1.06	C
707150	35182	150419982	A/T	A=0.67 T=0.33	A=0.67 T=0.33	0.9445	0.99	A
5872184	38332	150423132	-/C	--0.00 C=1.00	--0.00 C=1.00			
3783015	40875	150425675	G/A	G=0.61 A=0.39	G=0.60 A=0.40	0.7976	0.97	A
2042235	41624	150426424	T/C	T=0.13 C=0.87	T=0.20 C=0.80	0.0014	1.70	T
3783013	41671	150426471	A/G	A=0.97 G=0.03	A=0.82 G=0.18	~0.00001	0.14	G
2042236	41825	150426625	G/A	G=0.90 A=0.10	G=0.86 A=0.14	0.0420	0.69	A
1946234	42920	150427720	C/A	C=0.00 A=1.00	C=0.00 A=1.00			
1946235	42935	150427735	T/C	T= C=	T=0.87 C=0.13			
1946236	43001	150427801	T/A	T=0.19 A=0.81	T=0.20 A=0.80	0.5482	1.10	T
8177402	43012	150427812	T/C	T=0.00 C=1.00	T=0.00 C=1.00			

P A T E N T
Docket **SEQ-4095-PV**

dbSNP rs#	Position in SEQ ID NO: 5	Chromo-some Position	A1/A2 Allele	Control AF (High BMD)	Case AF (Low BMD)	p-Value	OR	Low BMD Associated Allele
8177403	43203	150428003	C/T	C=1.00 T=0.00	C=1.00 T=0.00			
8177404	43294	150428094	T/C	T=0.97 C=0.03	T=0.94 C=0.06	0.0363	0.52	C
8177405	43295	150428095	T/C	T=0.00 C=1.00	T=0.00 C=1.00			
8177406	43344	150428144	C/T	C=0.09 T=0.91	C=0.11 T=0.89	0.1222	1.36	C
8177407	43509	150428309	T/C	T=0.00 C=1.00	T=0.00 C=1.00			
8177408	43549	150428349	G/C	G=0.00 C=1.00	G=0.00 C=1.00			
8177409	43560	150428360	T/A	T=0.23 A=0.77	T=0.28 A=0.72	0.0779	1.29	T
6888961	43578	150428378	A/T	A=0.08 T=0.92	A=0.07 T=0.93	0.3176	0.79	T
8177410	43640	150428440	A/G	A= G=	A=0.00 G=1.00			
8177411	43792	150428592	G/C	G=1.00 C=0.00	G=1.00 C=0.00			
8177412	43797	150428597	C/T	C=0.15 T=0.85	C=0.18 T=0.82	0.0943	1.31	C
8177413	43964	150428764	C/G	C= G=	C=0.01 G=0.99			
870407	44297	150429097	C/T	C=0.07 T=0.93	C=0.11 T=0.89	0.0641	1.49	C
870406	44311	150429111	C/T	C=0.89 T=0.11	C=0.88 T=0.12	0.5675	0.87	T
6873202	44588	150429388	A/G	A=1.00 G=0.00	A=1.00 G=0.00			
8177414	44775	150429575	C/T	C=1.00 T=0.00	C=1.00 T=0.00			
8177415	44921	150429721	C/T	C=1.00 T=0.00	C=1.00 T=0.00			
3805435	45006	150429806	G/A	G=0.10 A=0.90	G=0.07 A=0.93	0.1318	0.71	A
8177416	45098	150429898	T/C	T=0.00 C=1.00	T=0.00 C=1.00			
3792799	45185	150429985	C/G	C=0.00 G=1.00	C=0.00 G=1.00			
3792798	45475	150430275	T/C	T=0.05 C=0.95	T=0.10 C=0.90	0.0906	2.06	T
3828599	45506	150430306	T/C	T=0.55	T=0.55	0.9993	1.00	T

dbSNP rs#	Position in SEQ ID NO: 5	Chromo-some Position	A1/A2 Allele	Control AF (High BMD)	Case AF (Low BMD)	p-Value	OR	Low BMD Associated Allele
				C=0.45	C=0.45			
8177417	45543	150430343	G/C	G=1.00 C=0.00	G=1.00 C=0.00			
3792797	45601	150430401	T/G	T=0.46 G=0.54	T=0.52 G=0.48	0.0520	1.27	T
8177418	45652	150430452	T/C	T=0.00 C=1.00	T=0.00 C=1.00			
8177419	45756	150430556	A/-	A=0.00 - =1.00	A=0.00 - =1.00			
8177420	45826	150430626	T/C	T=1.00 C=0.00	T=1.00 C=0.00			
8177421	45974	150430774	C/G	C=0.07 G=0.93	C=0.02 G=0.98			
4958872	46044	150430844	T/C	T=0.81 C=0.19	T=0.81 C=0.19	0.9167	0.98	T
3792796	46200	150431000	C/G	C=0.40 G=0.60	C=0.41 G=0.59	0.5382	1.08	C
8177422	46218	150431018	A/G	A=1.00 G=0.00	A=1.00 G=0.00			
8177423	46221	150431021	C/T	C=1.00 T=0.00	C=1.00 T=0.00			
4958434	46280	150431080	C/T	C=0.86 T=0.14	C=0.83 T=0.17	0.1864	0.79	T
8177424	46330	150431138	- /GAGT CCTGG	- =1.00 GAGTCCTG G=0.00	- =0.98 GAGTCCTG G=0.02			
8177425	46583	150431383	T/C	T=0.02 C=0.98	T=0.03 C=0.97	0.5080	1.30	T
8177426	46650	150431450	A/G	A=0.31 G=0.69	A=0.36 G=0.64	0.0447	1.29	A
8177427	46721	150431521	A/G	A=0.26 G=0.74	A=0.32 G=0.68	0.0296	1.33	A
8177429	46808	150431608	G/C	G=0.91 C=0.09	G=0.95 C=0.05	0.0132	1.89	G
6889737	47242	150432042	C/A	C=1.00 A=0.00	C=1.00 A=0.00			
3792795	47512	150432312	G/A	G=0.89 A=0.11	G=0.97 A=0.03	0.0000	3.53	G
8177430	47600	150432400	T/C	T=0.01 C=0.99	T=0.01 C=0.99			
8177431	47706	150432506	A/G	A=0.71 G=0.29	A=0.70 G=0.30	0.6316	0.94	G
4958873	47808	150432606	A/G	A=0.31 G=0.69	A=0.38 G=0.62	0.0279	1.32	A

P A T E N T
Docket SEQ-4095-PV

dbSNP rs#	Position In SEQ ID NO: 5	Chromo-some Position	A1/A2 Allele	Control AF (High BMD)	Case AF (Low BMD)	p-Value	OR	Low BMD Associated Allele
8177432	47978	150432778	T/G	T=1.00 G=0.00	T=1.00 G=0.00	0.2375	0.85	C
8177433	48021	150432821	T/C	T=0.26 C=0.74	T=0.23 C=0.77			
8177434	48025	150432825	G/A	G=0.00 A=1.00	G=0.00 A=1.00			
8177435	48093	150432893	T/G	T=0.81 G=0.19	T=0.79 G=0.21	0.4469	0.89	G
3763011	48413	150433213	T/C	T=0.01 C=0.99	T=0.02 C=0.98			
8177436	48933	150433733	C/T	C=0.00 T=1.00	C=0.00 T=1.00	~0.00001	0.38	G
8177437	49097	150433897	C/G	C=0.17 G=0.83	C=0.07 G=0.93			
4958874	49105	150433905	T/C	T=0.44 C=0.56	T=0.49 C=0.51	0.0880	1.24	T
8177439	49570	150434370	G/A	G= A=	G=1.00 A=0.00			
8177440	49591	150434391	C/T	C=1.00 T=0.00	C=1.00 T=0.00			
8177441	49704	150434504	G/C	G=1.00 C=0.00	G=1.00 C=0.00			
8177442	49705	150434505	A/T	A=1.00 T=0.00	A=1.00 T=0.00			
8177443	49798	150434598	C/T	C=1.00 T=0.00	C=1.00 T=0.00			
869975	50082	150434882	A/G	A=0.37 G=0.63	A=0.25 G=0.75	~0.00001	0.57	G
869976	50147	150434947	G/A	G=0.00 A=1.00	G=0.00 A=1.00			
8177444	50356	150435156	A/T	A=1.00 T=0.00	A=1.00 T=0.00			
8177445	50725	150435525	T/C	T=1.00 C=0.00	T=1.00 C=0.00			
7721469	50968	150435768	C/A	C=0.00 A=1.00	C=0.00 A=1.00			
8177446	51029	150435829	A/C	A=1.00 C=0.00	A=1.00 C=0.00			
7704191	51086	150435886	T/C	T=1.00 C=0.00	T=1.00 C=0.00	0.0030	1.50	T
8177447	51166	150435966	T/C	T=0.27 C=0.73	T=0.35 C=0.65			
11548	51493	150436293	C/T	C=0.90	C=0.95	0.0002	2.40	C

dbSNP rs#	Position in SEQ ID NO: 5	Chromo-some Position	A1/A2 Allele	Control AF (High BMD)	Case AF (Low BMD)	p-Value	OR	Low BMD Associated Allele
				T=0.10	T=0.05			
2230303	51539	150436339	G/T	G=0.00	G=0.01			
				T=1.00	T=0.99			
7722386	51562	150436362	G/A	G=0.00	G=0.00			
				A=1.00	A=1.00			
8177448	51645	150436445	G/A	G=0.99	G=0.99			
				A=0.01	A=0.01			
8177449	51649	150436449	T/C	T=0.17	T=0.14	0.2009	0.80	C
				C=0.83	C=0.86			
2070593	51650	150436450	T/C	T=0.31	T=0.28	0.2540	0.86	C
				C=0.69	C=0.72			
8177450	51656	150436456	G/A	G=0.00	G=0.00			
				A=1.00	A=1.00			
8177451	51657	150436457	T/C	T=0.00	T=0.00			
				C=1.00	C=1.00			
8177452	52009	150436809	G/A	G=0.00	G=0.00			
				A=1.00	A=1.00			
8177453	52143	150436943	A/C	A=0.00	A=0.00			
				C=1.00	C=1.00			
8177454	52349	150437149	G/C	G=0.99	G=0.98			
				C=0.01	C=0.02			
3763010	52421	150437221	C/T	C=0.76	C=0.80	0.1337	1.30	C
				T=0.24	T=0.20			
8177455	52532	150437332	A/G	A=0.00	A=0.00			
				G=1.00	G=1.00			
8177456	52682	150437482	A/G	A=0.45	A=0.50	0.1098	1.22	A
				G=0.55	G=0.50			
736775	53058	150437858	T/C	T=0.56	T=0.59	0.3945	1.12	T
				C=0.44	C=0.41			
2277940	53187	150437987	T/C	T=0.92	T=0.97	0.0004	2.75	T
				C=0.08	C=0.03			
8177458	53377	150438177	G/A	G=0.98	G=0.98	0.9445	1.03	G
				A=0.02	A=0.02			
8177834	53699	150438499	G/A	G=0.93	G=0.89	0.0113	0.58	A
				A=0.07	A=0.11			
3924	53845	150438645	A/G	A=0.75	A=0.74	0.7350	0.95	G
				G=0.25	G=0.26			
2233312	53920	150438720	A/G	A=0.00	A=0.00			
				G=1.00	G=1.00			
2233311	53929	150438729	T/G	T=0.15	T=0.20	0.0106	1.49	T
				G=0.85	G=0.80			
2233310	55473	150440273	T/C	T=0.00	T=0.00			T
				C=1.00	C=1.00			

dbSNP rs#	Position in SEQ ID NO: 5	Chromo-some Position	A1/A2 Allele	Control AF (High BMD)	Case AF (Low BMD)	p-Value	OR	Low BMD Associated Allele
2233309	55690	150440490	A/G	A=0.00 G=1.00	A=0.00 G=1.00			
4958875	55850	150440650	A/G	A=0.56 G=0.44	A=0.53 G=0.47	0.2131	0.86	G
2233308	56761	150441561	C/T	C=1.00 T=0.00	C=1.00 T=0.00			
2233307	56840	150441640	C/G	C=0.00 G=1.00	C=0.00 G=1.00			
2233306	57000	150441800	C/T	C=1.00 T=0.00	C=1.00 T=0.00			
2233305	57116	150441916	T/G	T= G=	T=0.27 G=0.73			
2233304	58419	150443219	T/G	T=0.00 G=1.00	T=0.01 G=0.99			
2233303	58420	150443220	C/T	C=1.00 T=0.00	C=1.00 T=0.00			
2233302	58808	150443608	G/C	G=0.98 C=0.02	G=0.87 C=0.13	~0.00001	0.14	C
2287719	58906	150443706	A/G	A=0.00 G=1.00	A=0.00 G=1.00			
2287720	59048	150443848	C/T	C=0.39 T=0.61	C=0.42 T=0.58	0.2852	1.14	C
7727034	59187	150443987	C/G	C=0.24 G=0.76	C=0.30 G=0.70	0.0374	1.36	C
7727250	59361	150444161	C/T	C=0.33 T=0.67	C=0.43 T=0.57	0.0003	1.57	C
7709800	61218	150446018	G/A	G=1.00 A=0.00	G=1.00 A=0.00			
3840312	61700	150446500	G/-	G=0.54 - =0.46	G=0.50 - =0.50	0.1346	0.84	-
2287721	62290	150447090	G/A	G=1.00 A=0.00	G=1.00 A=0.00			
6875293	62596	150447396	T/C	T=0.00 C=1.00	T=0.00 C=1.00			
3805434	64049	150448849	G/C	G=0.93 C=0.07	G=0.87 C=0.13	0.0009	0.51	C
2080982	66077	150450877	G/T	G=0.02 T=0.98	G=0.01 T=0.99			
2080983	66079	150450879	G/T	G=1.00 T=0.00	G=1.00 T=0.00			
2287722	66086	150450886	T/C	T=0.00 C=1.00	T=0.00 C=1.00			
2233301	66115	150450915	T/G	T=0.00	T=0.00			

P A T E N T
Docket SEQ-4095-PV

dbSNP rs#	Position in SEQ ID NO: 5	Chromo-some Position	A1/A2 Allele	Control AF (High BMD)	Case AF (Low BMD)	p-Value	OR	Low BMD Associated Allele
				G=1.00	G=1.00			
2233300	66150	150450950	C/G	C=0.00	C=0.00			
				G=1.00	G=1.00			
4958876	66475	150451275	C/A	C=	C=0.95			
				A=	A=0.05			
2233299	69177	150453977	A/G	A=0.48	A=0.49	0.7917	1.03	A
				G=0.52	G=0.51			
2233298	69210	150454010	A/G	A=0.00	A=0.00			
				G=1.00	G=1.00			
2287723	69312	150454112	T/G	T=1.00	T=1.00			
				G=0.00	G=0.00			
2161359	70244	150455044	A/G	A=0.53	A=0.51	0.5813	0.94	G
				G=0.47	G=0.49			
7734456	70882	150455682	G/C	G=0.53	G=0.60	0.0188	1.32	G
				C=0.47	C=0.40			
4292439	71905	150456705	T/C	T=0.87	T=0.84	0.1343	0.77	C
				C=0.13	C=0.16			
4958878	72294	150457094	A/T	A=	A=0.12			
				T=	T=0.88			
6862024	72581	150457381	A/G	A=0.80	A=0.78	0.4512	0.89	G
				G=0.20	G=0.22			
3834819	72786	150457589	-/CA	-=0.00	-=0.00			
				CA=1.00	CA=1.00			
2233297	72950	150457750	G/A	G=0.04	G=0.05	0.3215	1.32	G
				A=0.96	A=0.95			
2233296	73106	150457908	G/A	G=1.00	G=1.00			
				A=0.00	A=0.00			
2233295	73162	150457962	T/C	T=0.00	T=0.00			
				C=1.00	C=1.00			
2233294	73273	150458073	G/T	G=0.24	G=0.23	0.7059	0.95	T
				T=0.76	T=0.77			
7713028	74131	150458931	G/A	G=0.9	G=0.85	0.0238	0.66	A
				A=0.1	A=0.15			
7713223	74406	150459206	T/C	T=0.93	T=0.88	0.0047	0.56	C
				C=0.07	C=0.12			
7713567	74665	150459465	C/T	C=0.61	C=0.63	0.4135	1.10	C
				T=0.39	T=0.37			
888989	74740	150459540	T/C	T=0.90	T=0.86	0.0352	0.67	C
				C=0.10	C=0.14			
2233293	75382	150460182	A/G	A=0.00	A=0.00			
				G=1.00	G=1.00			
3749657	75400	150460200	G/T	G=1.00	G=1.00			
				T=0.00	T=0.00			

dbSNP rs#	Position in SEQ ID NO: 5	Chromo-some Position	A1/A2 Allele	Control AF (High BMD)	Case AF (Low BMD)	p-Value	OR	Low BMD Associated Allele
2233292	75460	150460260	G/A	G= A=	G=1.00 A=0.00			
2112635	75863	150460663	C/T	C=0.35 T=0.65	C=0.36 T=0.64	0.7381	1.04	C
871269	76098	150460898	T/C	T=0.47 C=0.53	T=0.42 C=0.58	0.0798	0.81	C
3792794	78432	150463232	A/G	A=0.21 G=0.79	A=0.10 G=0.90	~0.00001	0.41	G
6579837	78604	150463404	G/T	G=0.89 T=0.11	G=0.91 T=0.09	0.1630	1.33	G
3805433	79190	150463990	C/G	C=0.28 G=0.72	C=0.28 G=0.72	0.9484	0.99	C
5872186	79870	150464670	-/A	-=0.33 A=0.67	-=0.35 A=0.65	0.5526	1.08	-
2233291	79928	150464728	G/C	G=1.00 C=0.00	G=1.00 C=0.00			
2233290	80213	150465013	G/C	G=0.14 C=0.86	G=0.13 C=0.87	0.8704	0.97	C
2233289	80227	150465027	C/T	C=1.00 T=0.00	C=0.99 T=0.010			
4958435	81994	150466794	T/G	T=0.68 G=0.32	T=0.63 G=0.37	0.0549	0.79	G
4958880	82187	150466987	C/A	C=0.75 A=0.25	C=0.84 A=0.16	0.0002	1.76	C
1422673	82698	150467498	T/C	T=0.45 C=0.55	T=0.32 C=0.68	~0.00001	0.59	C
2042234	82841	150467641	A/G	A=0.91 G=0.09	A=0.93 G=0.07	0.1485	1.37	A
3805432	83214	150468014	A/G	A=0.04 G=0.96	A=0.07 G=0.93	0.0188	1.93	A
3805431	83249	150468049	T/C	T=0.06 C=0.94	T=0.02 C=0.98			
2233288	83485	150468285	T/C	T=0.00 C=1.00	T=0.00 C=1.00			
2233287	83807	150468607	C/T	C=0.90 T=0.10	C=0.92 T=0.08	0.2555	1.32	C
3815720	83907	150468707	G/A	G=0.99 A=0.01	G=0.97 A=0.03			
3792792	84216	150469016	A/G	A=1.00 G=0.00	A=0.99 G=0.01			
3792791	84656	150469456	A/G	A=0.00 G=1.00	A=0.00 G=1.00			
2303018	85448	150470248	G/A	G=1.00	G=1.00			

P A T E N T
Docket SEQ-4095-PV

dbSNP rs#	Position in SEQ ID NO: 5	Chromo-some Position	A1/A2 Allele	Control AF (High BMD)	Case AF (Low BMD)	p-Value	OR	Low BMD Associated Allele
				A=0.00	A=0.00			
3792790	85881	150470681	G/T	G=0.49	G=0.49	0.9686	1.00	G
				T=0.51	T=0.51			
4958436	86539	150471339	T/C	T=0.88	T=0.92	0.0083	1.76	T
				C=0.12	C=0.08			
2233286	86796	150471596	T/C	T=0.00	T=0.00			
				C=1.00	C=1.00			
2233285	87057	150471857	G/A	G=1.00	G=1.00			
				A=0.00	A=0.00			
7732451	87922	150472722	T/C	T=0.90	T=0.92	0.2349	1.29	T
				C=0.10	C=0.08			
2233284	88098	150472898	T/C	T=0.00	T=0.00			
				C=1.00	C=1.00			
1422674	89319	150474119	G/T	G=	G=			
				T=	T=			
3792789	89678	150474478	C/T	C=0.42	C=0.42	0.9873	1.00	C
				T=0.58	T=0.58			
4562032	90026	150474826	C/A	C=	C=1.00			
				A=	A=0.00			
6865077	90033	150474833	G/A	G=1.00	G=1.00			
				A=0.00	A=0.00			
1559126	90114	150474914	C/G	C=1.00	C=1.00			
				G=0.00	G=0.00			
3792788	90326	150475126	T/C	T=0.00	T=0.00			
				C=1.00	C=1.00			
1559127	90463	150475263	T/C	T=0.94	T=0.94	0.6080	1.14	T
				C=0.06	C=0.06			
3792786	90548	150475348	A/G	A=0.98	A=0.99			
				G=0.02	G=0.01			
6880110	90800	150475600	A/G	A=0.91	A=0.92	0.5433	1.14	A
				G=0.09	G=0.08			
6861227	90838	150475638	G/T	G=0.26	G=0.23	0.1843	0.83	T
				T=0.74	T=0.77			
3805430	91400	150476200	C/G	C=0.02	C=0.05			
				G=0.98	G=0.95			
1862364	92086	150476886	A/G	A=0.91	A=0.92	0.5575	1.13	A
				G=0.09	G=0.08			
4958881	93946	150478746	T/C	T=0.91	T=0.91	0.9701	1.01	T
				C=0.09	C=0.09			
3792785	95360	150480160	A/G	A=0.92	A=0.93	0.5448	1.16	A
				G=0.08	G=0.07			
6869605	96576	150481376	A/C	A=0.90	A=0.89	0.7189	0.93	C
				C=0.10	C=0.11			

dbSNP rs#	Position in SEQ ID NO: 5	Chromo-some Position	A1/A2 Allele	Control AF (High BMD)	Case AF (Low BMD)	p-Value	OR	Low BMD Associated Allele
6870205	96721	150481521	A/G	A=0.00 G=1.00	A=0.07 G=0.93			
4246047	98316	150483116	T/A	T=0.94 A=0.06	T=0.96 A=0.04	0.2613	1.37	T
4958882	98497	150483297	C/G	C=0.88 G=0.12	C=0.89 G=0.11	0.7723	1.06	C
3792784	99382	150484182	C/T	C=0.00 T=1.00	C=0.04 T=0.96			
3792783	99442	150484242	T/C	T=0.85 C=0.15	T=0.87 C=0.13	0.2391	1.22	T
5872188	99764	150484565	-/AG	-=0.90 AG=0.10	-=0.91 AG=0.09	0.5908	1.11	-

[0252] Allelotyping results were considered particularly significant with a calculated p-value of less than or equal to 0.05 for allelotype results. These values are indicated in bold. The allelotyping p-values were plotted in Figure 4. The position of each SNP on the chromosome is presented on the x-axis. The y-axis gives the negative logarithm (base 10) of the p-value comparing the estimated allele in the case group to that of the control group. The minor allele frequency of the control group for each SNP designated by an X or other symbol on the graphs in Figure 4 can be determined by consulting Table 27. For example, the left-most X on the left graph is at position 150385031. By proceeding down the Table from top to bottom and across the graphs from left to right the allele frequency associated with each symbol shown can be determined.

[0253] To aid the interpretation, multiple lines have been added to the graph. The broken horizontal lines are drawn at two common significance levels, 0.05 and 0.01. The vertical broken lines are drawn every 20kb to assist in the interpretation of distances between SNPs. Two other lines are drawn to expose linear trends in the association of SNPs to the disease. The light gray line (or generally bottom-most curve) is a nonlinear smoother through the data points on the graph using a local polynomial regression method (W.S. Cleveland, E. Grosse and W.M. Shyu (1992) Local regression models. Chapter 8 of Statistical Models in S eds J.M. Chambers and T.J. Hastie, Wadsworth & Brooks/Cole.). The black line provides a local test for excess statistical significance to identify regions of association. This was created by use of a 10kb sliding window with 1kb step sizes. Within each window, a chi-square goodness of fit test was applied to compare the proportion of SNPs that were significant at a test wise level of 0.01, to the proportion that would be expected by chance alone (0.05 for the methods used here). Resulting p-values that were less than 10^{-8} were truncated at that value.

[0254] Finally, the exons and introns of the genes in the covered region are plotted below each graph at the appropriate chromosomal positions. The gene boundary is indicated by the broken horizontal line. The exon positions are shown as thick, unbroken bars. An arrow is placed at the 3' end of each gene to show the direction of transcription.

Example 10

In Vitro Production of Target Polypeptides

[0255] cDNA is cloned into a pIVEX 2.3-MCS vector (Roche Biochem) using a directional cloning method. A cDNA insert is prepared using PCR with forward and reverse primers having 5' restriction site tags (in frame) and 5-6 additional nucleotides in addition to 3' gene-specific portions, the latter of which is typically about twenty to about twenty-five base pairs in length. A Sal I restriction site is introduced by the forward primer and a Sma I restriction site is introduced by the reverse primer. The ends of PCR products are cut with the corresponding restriction enzymes (*i.e.*, Sal I and Sma I) and the products are gel-purified. The pIVEX 2.3-MCS vector is linearized using the same restriction enzymes, and the fragment with the correct sized fragment is isolated by gel-purification. Purified PCR product is ligated into the linearized pIVEX 2.3-MCS vector and *E. coli* cells transformed for plasmid amplification. The newly constructed expression vector is verified by restriction mapping and used for protein production.

[0256] *E. coli* lysate is reconstituted with 0.25 ml of Reconstitution Buffer, the Reaction Mix is reconstituted with 0.8 ml of Reconstitution Buffer; the Feeding Mix is reconstituted with 10.5 ml of Reconstitution Buffer; and the Energy Mix is reconstituted with 0.6 ml of Reconstitution Buffer. 0.5 ml of the Energy Mix was added to the Feeding Mix to obtain the Feeding Solution. 0.75 ml of Reaction Mix, 50 μ l of Energy Mix, and 10 μ g of the template DNA is added to the *E. coli* lysate.

[0257] Using the reaction device (Roche Biochem), 1 ml of the Reaction Solution is loaded into the reaction compartment. The reaction device is turned upside-down and 10 ml of the Feeding Solution is loaded into the feeding compartment. All lids are closed and the reaction device is loaded into the RTSS500 instrument. The instrument is run at 30°C for 24 hours with a stir bar speed of 150 rpm. The pIVEX 2.3 MCS vector includes a nucleotide sequence that encodes six consecutive histidine amino acids on the C-terminal end of the target polypeptide for the purpose of protein purification. Target polypeptide is purified by contacting the contents of reaction device with resin modified with Ni^{2+} ions. Target polypeptide is eluted from the resin with a solution containing free Ni^{2+} ions.

Example 11

Cellular Production of Target Polypeptides

[0258] Nucleic acids are cloned into DNA plasmids having phage recombination sites and target polypeptides are expressed therefrom in a variety of host cells. Alpha phage genomic DNA contains short sequences known as attP sites, and *E. coli* genomic DNA contains unique, short sequences known as attB sites. These regions share homology, allowing for integration of phage DNA into *E. coli* via directional, site-specific recombination using the phage protein Int and the *E. coli* protein IHF. Integration produces two new att sites, L and R, which flank the inserted prophage DNA. Phage excision from *E. coli* genomic DNA can also be accomplished using these two proteins with the addition of a second phage protein, Xis. DNA vectors have been produced where the integration/excision process is modified to allow for the directional integration or excision of a target DNA fragment into a backbone vector in a rapid *in vitro* reaction (Gateway™ Technology (Invitrogen, Inc.)).

[0259] A first step is to transfer the nucleic acid insert into a shuttle vector that contains attL sites surrounding the negative selection gene, ccdB (*e.g.* pENTER vector, Invitrogen, Inc.). This transfer process is accomplished by digesting the nucleic acid from a DNA vector used for sequencing, and to ligate it into the multicloning site of the shuttle vector, which will place it between the two attL sites while removing the negative selection gene ccdB. A second method is to amplify the nucleic acid by the polymerase chain reaction (PCR) with primers containing attB sites. The amplified fragment then is integrated into the shuttle vector using Int and IHF. A third method is to utilize a topoisomerase-mediated process, in which the nucleic acid is amplified via PCR using gene-specific primers with the 5' upstream primer containing an additional CACC sequence (*e.g.*, TOPO® expression kit (Invitrogen, Inc.)). In conjunction with Topoisomerase I, the PCR amplified fragment can be cloned into the shuttle vector via the attL sites in the correct orientation.

[0260] Once the nucleic acid is transferred into the shuttle vector, it can be cloned into an expression vector having attR sites. Several vectors containing attR sites for expression of target polypeptide as a native polypeptide, N-fusion polypeptide, and C-fusion polypeptides are commercially available (*e.g.*, pDEST (Invitrogen, Inc.)), and any vector can be converted into an expression vector for receiving a nucleic acid from the shuttle vector by introducing an insert having an attR site flanked by an antibiotic resistant gene for selection using the standard methods described above. Transfer of the nucleic acid from the shuttle vector is accomplished by directional recombination using Int, IHF, and Xis (LR clonase). Then the desired sequence can be transferred to an expression vector by carrying out a one hour incubation at room temperature with Int, IHF, and Xis, a ten minute incubation at 37°C with proteinase K,

transforming bacteria and allowing expression for one hour, and then plating on selective media. Generally, 90% cloning efficiency is achieved by this method. Examples of expression vectors are pDEST 14 bacterial expression vector with att7 promoter, pDEST 15 bacterial expression vector with a T7 promoter and a N-terminal GST tag, pDEST 17 bacterial vector with a T7 promoter and a N-terminal polyhistidine affinity tag, and pDEST 12.2 mammalian expression vector with a CMV promoter and neo resistance gene. These expression vectors or others like them are transformed or transfected into cells for expression of the target polypeptide or polypeptide variants. These expression vectors are often transfected, for example, into murine-transformed adipocyte cell line 3T3-L1, (ATCC), human embryonic kidney cell line 293, and rat cardiomyocyte cell line H9C2.

Representative Nucleotide and Amino Acid Sequences

[0261] Following is a genomic nucleotide sequence for a *CTEP* region. The genomic nucleotide sequence is set forth in SEQ ID NO: 1. The following nucleotide representations are used throughout: "A" or "a" is adenosine, adenine, or adenylic acid; "C" or "c" is cytidine, cytosine, or cytidylic acid; "G" or "g" is guanosine, guanine, or guanylic acid; "T" or "t" is thymidine, thymine, or thymidylic acid; and "I" or "i" is inosine, hypoxanthine, or inosinic acid. Exons are indicated in italicized lower case type, introns are depicted in normal text lower case type, and polymorphic sites are depicted in bold upper case type. SNPs are designated by the following convention: "R" represents A or G, "M" represents A or C; "W" represents A or T; "Y" represents C or T; "S" represents C or G; "K" represents G or T; "V" represents A, C or G; "H" represents A, C, or T; "D" represents A, G, or T; "B" represents C, G, or T; and "N" represents A, G, C, or T.

>16:56742951-56841200

```

1      tgtctaaaaa ttattatggc tgaacatac ttatcatttg ttttctgtag tagaaaaatgg
61     cataatatga gaaggcctac tttgtaatag ttgtttgctt tacttaatat ttttcaaadc
121    agccatctgt gtgaagactc aatatcaagt taggccttta aaagggggaa aataattcaa
181    aaccactggc agctgtggtt ttccRgcctt ttctattggt tgaactctgt aataaatgca
241    ggaccctaca tatacaaaaag gtactgtttt ccaaattcac gtatgtatta gcatttacct
301    ttaaaagtct catccgtcag aaaaacgggtg aacacagcat tcagtataatt tatttttggtt
361    tagttacaca gtgtcaaaaa gttctgatgt atatggataa gtagatgcac tttttgctgt
421    tttgtttggt taaacagctt gctttaatta tctcaagcta cttggcagga acacctttat
481    tccagggttc gcataatcag ttattctggc aagagtagat taacacgtta gtgatctcca
541    atagacagat tatatgttaa tattatttga ggccattatt ttaagtaca atttagacgg
601    agtttcaaat agattttaaa aatgagattt gtataaaaaga gtgtgcagtc cctatggtgt
661    taaaatcact gatatggagg agaagagggg ttggaattgt gacactgtgg cagcagatga
721    ccttggaaca gtacagttttt cagactttcc tcccttaaaa tagggatact aaatctcaca
781    ggggtggtgt gtataatgtc acccacacgc catctcctct ataactgcat ttgtatgcca
841    ggaaattgtc tgtgaaggct tcagtttaga atagcttcat attatttttg ggcaactgctg
901    ggtgattttg gtttaaggctg gccttgagg ttctctgagt tttctctgaa accaaactca
961    atttggttgt aggttccctg tttgctgttt gttgctttta gtaataggag tcagtcagtt
1021   tacctgggag ttaagttttg actggagata atttgccatt cttttttttt tttttttttt
1081   ttttttttga gatagggtct cactctgtcg cccaggctgg agtgcagtga catgatcttg
1141   gctcactgca acctctgcct ccttggttca agcgattccc ctgcctcagc ctctgagta
1201   gtttgggtta caggcacaag ccaccacgcc cagctaattt ttgcattttt agtagagatg
1261   ggggtttcacc atgttgcca ggctggtctc gaaccctga cctcaggtga tctgccgcc
1321   ttggcctccc acagtgttg gattacagc atgagccacc atgccagcc gataatttgc
1381   cattctgtat ttatttgcgt gttagagacc agttaagtt aagacacttt cttaaataaa
1441   gtcttgataa tggggctttt gagaaagtgt tttccctga tgctgggggg aaacacacat
1501   attcaaatga cttgtataaa acagtttatt ctgtgtttag gaacttgtag gggtgaaatg
1561   ctgacctgtg ttactctttc ttccatgat cagcRtccag aggaccagag gtttaatttat
1621   tctgggaagc tgttgttggg tcaccaatgt ctcagggact tgcttccaaa ggtacatcac
1681   ttacacatta acttctgaat gtttttaagc actcaccagg ttaggttcag gtccttaagt
1741   accttcgtat tacttttagc agggaaaaacg gcatgttttg catctggtgt gcaatgtgaa
1801   gagtccttca aaaatgccag aaatcaacgc caagggtgtgt ctgcctcttc atgattgttaa
1861   caatttgtat cattcagact ttcaggggag taataaaaaga agttggataa aacgtttatt
1921   gagagactgt atggtgttat taccaagtaa tattttgttt ctttccagg aattagaaac
1981   tgtattatca acacaaaagt atgagttaat agtagcagat tgttccgtaa gtgctgtagt
2041   agaaagggtg agttacatat tgcactatct tatgggatag gatttgatct atgggtactg
2101   tgtatctaga ttactgaact aacactaatc ggttttttat tgaatttagc acatagcaag
2161   tttcttcaaa ggagtcacta atttttttaa agagtacaaa agtgaatata tttcctttgg

```

2221	aaattttcat	tgtgattagt	tggataggaa	aagatcagag	tttttatcaa	gtgatcttta
2281	aagaattttt	tttttttaaa	aatgggtctc	ctgtgtggcc	caggcttttc	tcaaactcct
2341	gagggcaagc	gatcctccca	cctcagcctc	ctgagtagct	gggactacag	gcatgtgcca
2401	ctagacctgg	ctctaaagac	atatatgaca	cacgaaacca	tttatttttc	atttcacaa
2461	gtttattcac	atatatggtg	ttagtattct	aatgtagtga	tgcaactctaa	atttcagatta
2521	tatttcctag	aacatctgaa	cagagcatag	gaaattccct	attttgccat	tatcagttct
2581	aacaaaaatc	ttaaaagcac	tttatcattt	catttccctg	cactgtaatt	tttttaaatg
2641	atcaaaaaac	gtatcatacc	aaggcttact	tatatggaa	tactatttta	gaaagtgtg
2701	ggctgggttg	tatttataaa	tcttgttggt	cagatgtctg	caatgagtaa	atttagcacc
2761	attatcagga	agctttctca	ccaatgacaa	cttcattgga	agattttaat	gaaagtgtag
2821	catactctag	ggaaaaaata	tgaatatttt	agcatctatg	tattgaaaat	tatgttgaa
2881	aaatgtcaga	ctatttttta	cataacgttg	cttctgttta	attttgtcac	gttcagaggt
2941	ggggggtagg	agatgtaagc	ccttgacagc	aaaataattc	cctttgcttg	atttcagaca
3001	gttgcatcag	ctcctttgtt	ctgtgttcac	gttacactta	tttaggtggc	tgaatccaca
3061	gaggagcctg	ctggttctaa	tcggggacag	tatcctgagg	attcctcaag	tgatggttta
3121	aggcaagg	aagtctctcg	gaacctttct	tcccctggat	gggaaaacat	ctcaaggtga
3181	gtgttataat	aaagatcttg	gcttatgcaa	catgaatgtt	cctcgtttgc	atcaatttaa
3241	gaataaggta	tgtttacacg	tataaatca	gaacttttaa	acatacagaa	ttttgtctta
3301	taaatagctt	cgctttaaag	atctcttata	tatttaactt	ttcttaatac	acagcctttt
3361	agtacacaca	aatttaaaaa	gtaggtaatg	catatattga	aaaaaaaaag	aaaatgtagg
3421	cgttttatcc	ttccattgtg	ctgaccgtct	ggttgccgtc	atgataggaa	attagtgcctg
3481	ctgcaggaga	aaacagctgt	cgtaagcatt	gtgcagctgc	tttgctgagt	ggctttgtgc
3541	tttattgtaa	caatgggtga	caacaaggga	gagactgttt	aagaagtgtc	cttccaaaga
3601	cttgggggta	ctaggaaaat	tgggcaattt	cttataacta	ttaaagcttt	tctttagagc
3661	aaaagtcaga	actaaatgct	ctgttatttg	gatttttata	gctcttgtaa	tacattgttt
3721	ttggggaaaa	attcatthaac	tgcaagttgc	aattctgtaa	ctctccaatt	ctccgtcccc
3781	ctttttctag	tactttttat	acacaatatt	ttataaagcc	aggtgtttta	ggaatgagtt
3841	tttcttcctt	ttccccttta	atgggaactt	caaataatac	caacagtggg	gactggataa
3901	ttaatcccca	caccatcacc	caggccta	aaataacaat	cagagtttta	ccatagctca
3961	tctattaccc	tttccccttt	ttttaaaaaa	agagtattta	aaagtaattc	ccaggcatca
4021	tgttatttca	tccctatatt	cttcagtata	taactatgaa	aaccttttag	ttatcttgta
4081	tatctagaat	gccattatca	gatctaacag	aaatcttaaa	agcactttat	cattttattt
4141	ccatgcactg	taattttctt	aaatgatcaa	aaacagcatc	ataccaaaag	ttacttgtat
4201	tggaatacta	ttttagaaat	actctgtgta	tggaatttag	ttaaaagatt	gtcagcatat
4261	aaattggata	attattggat	agaaaattat	tggttagaaa	aacttaaaac	tacttccctt
4321	attctgtatt	aactattctt	aacttgagaa	ttgaggctca	tatttgactc	tctgaatctc
4381	accatattta	aacttgattt	cctttaacaa	atattttattg	aacagccagt	acatacaact
4441	ttgcttaagg	atatgagttg	acctgcagga	atgaccacat	aaccaatttc	tgatctttgg
4501	gcaattctat	tatggtttca	attttgtgat	gtgctactga	agaaattgac	tgtgtaagaa
4561	gcacaaagcc	aaagatgact	cgcatacacc	tgccctgtga	agttgagggc	tgtgtggcct
4621	gattaaagaa	gcatgcattt	ggccgggccc	gggtgctcac	acctgtaatc	ccagcacttt
4681	gggaggccaa	ggtgggcgga	tcacgaggtc	aggagattga	gaccatcctg	gctaacacgg
4741	tgaaaccccc	tctgtactaa	aagtacaaaa	aattagccag	gtgtggtggc	gtgtgcccgt
4801	agtcccagct	actggggagg	ctgaggcagg	agaatgggtg	gaatccggga	ggtggagctt
4861	gcagtggacc	gagattgcgc	cattgcactc	caggctgggc	aacagagcga	gactccatct
4921	caaaaaaaaa	aaaaaagaag	catgcatttg	acatcagacc	agctctgaaa	tccagccctg
4981	ctacttacta	gctcagtgac	cttgtgcaaa	gcccctgtct	tccctgagct	gtacttgggt
5041	tccccttgta	aaatctcctt	catgagattg	ctgtggaccc	agcagcctgt	acaggacccc
5101	cgggtgtcag	taagcatgca	caggtgatac	cacatgcaca	cttcactata	gattcagatg
5161	gaggtggag	gaagaagtgg	atattgggag	gatgggagag	atttccttca	ggaaagactg
5221	ggagaaatgt	ggcttttgag	ctgctctcta	aaagatgaac	agtggttga	gacctgcagt
5281	gagactcaac	aagtcaaaac	tgagggtgga	tctacttaac	ccaaaaaggt	tgtttatata
5341	tctgtgcact	cagcaagcag	gtggcaagg	ctgttgtttt	cctgtgggat	gggactgtgg
5401	tagaagtgtc	gtgtcattta	gtaccttctg	tgcttgtggt	acatgggtgc	gtcatagctg
5461	catttaccat	gtaactgccc	taaaattccat	tcttcYgtct	cttcgatttg	aattcttgat
5521	tttaatttaa	acttagtttt	catttgttca	tactcaaccc	actcaaaatg	agtggttttt
5581	caaatctatg	tataggcctg	aagctgccca	gcaggcattc	caaggcctgg	gtcctggttt
5641	ctccggttac	acaccctatg	ggtggcttca	gcttctcttg	ttccagcaga	tatatgacag
5701	acagtactac	atgcaatagt	gagtccttcc	cgccatgctg	ggtgtggcca	gggctcccgg
5761	gaattgaagg	gaattttatc	cRtgttacct	gtaaaagtta	gaatggagg	atgagtgat
5821	tttcatcagt	ctgcagagcc	ctgctctgtt	tggtctgtgg	gtagagtgtg	aatgacagct

5881	gctacctgat	ttgtgtattg	acacaagRgt	gcttttgtct	gatacatagt	ttagtgactt
5941	tatttagaac	atgttacttt	cttttcaatt	tgtgctatct	tcaaagtttt	gtgaggattt
6001	taatttgct	ctgtgccata	atcttacagt	gggcttgatg	tttaatttca	gggtgaaattc
6061	accttggtgc	ttttcttaga	aaaggcattt	atagatatag	ttagtaagga	agttcttcac
6121	taaattgaag	aaaaatcaaa	ggcataatcta	cctacttgaa	attcttaaca	gtaaaagact
6181	gctgtgtaaa	taagccacag	acttcacggt	gctttgggtc	caacagtatc	tgcctctgtc
6241	gtttttat	tagtttagca	gccactgctg	catcaggggc	ttttgttcca	ccaccaagtg
6301	cacaagagat	acctgtggtc	tctgcacctg	ctccagcccc	tattcacaac	cagtttccag
6361	ctgaaaacca	gcctgccaat	cagaatgctg	ctcctcaagt	ggttggttaat	cctggagcca
6421	atcaaaat	gcggatgaat	gcacaagggtg	gccctattgt	ggaagaagat	gatgaaataa
6481	atcgagattg	gttggtattg	acctattcag	cagctacatt	ttctgttttt	ctcagtatcc
6541	tctacttcta	ctcctccctg	agcagattcc	tcatggtcac	gggggccacc	gttggtatgt
6601	acctgtgaag	agatggtttc	ctctaataaa	attacactac	actgtgttca	cactaagcag
6661	attttgcctc	ttttgtttct	tggttttttt	gagatggagt	ctcgtctgt	cattcaggct
6721	ggagtacaat	ggcacaatca	ctgcaatctc	cgcttcccag	gttcaagcga	ttctcctgcc
6781	tcagcctcct	gggtagttgg	gattacaggc	gcccaccacc	atgcctggct	aatttttata
6841	tttctagtag	agacggggtt	tggtcatggt	ggccaggtgg	tctcgaactc	ctgacctcaa
6901	gtgatctgcc	caccttggtc	tcccaaagtg	ctggtattac	aggcgtgagc	caccactgcg
6961	cctggccaga	ttttgctctt	ttttgagcag	tctcagttac	tgtagaagga	gatgtgttta
7021	aatagtatat	cactctgtgg	ctgggcgcag	tggctcacac	ctgtaatccc	agcagtttgg
7081	gaggccgagg	caggaggatc	acatgaggcc	aggagtgtga	gaccatcctg	gccaatatgg
7141	tgaaccctcg	tctctactaa	aaatacaaaa	aattagccgg	gtgtgggtggc	acgggcctgt
7201	aatttacttg	gggtggttaag	gcaggagaat	tgcttgaact	ggggaggcag	agggtgcagt
7261	gagccaagat	cgccacctg	cactccagcc	tggttgacag	agcaagacct	tgtcttagaa
7321	taaatacata	ataaatagta	tgatttctgg	cactttcgat	acaaggaatt	catggcttgg
7381	ttgtatggtc	ccaagaacat	atcaatcctg	tgtaaatata	agaatattat	cttgtcctct
7441	agataagcta	ccttaccttc	caggctcaca	aaccacaagt	atgtagccat	actgaggcat
7501	ggaacagaaa	actgtatttg	ttttgaatga	gaacacattt	gcctttatca	gRccacagct
7561	gccttccagg	gtaaagtcag	gcactgactg	ttagcatggc	cctgaaaggc	aagggaacct
7621	tcacatacct	gacatttggt	tttagctgtg	gcccgaagca	gtagtcttca	actgggggtg
7681	gttttgtacc	ctctctcccc	aggggacatt	tggcaatgtg	tagatatattt	tgggtgtcac
7741	atctagggga	agtggctcctg	ctggcgctcta	gttagtagaa	gcaagagtg	tgctgaattt
7801	tctacaatgc	acaggacaac	tcccacagta	aatatttggc	tcaatatgtc	actagtacca
7861	aagctgagaa	agcctggcct	agagtgtatg	gtcttctgtg	ttgaaactaa	aagaagaaat
7921	tttctgtgat	agtaaaaatg	gatttttatt	ttagctttta	aaaataaaaa	aggaataatt
7981	agaatataat	gaacactcaa	atatccacaa	ttagtcattg	ttaatatttt	attatattta
8041	agacttggga	tttaattggt	ttcttcaaat	aaaacgttta	gttaatatatt	tctgtagtct
8101	ctagaatcat	atatttataa	gaccaaatgt	aggttgtcat	tatgttatat	ataattatag
8161	ctttgtaggt	atatgcattc	tccccgctc	gttcagggtt	tcaagggtaa	ggtttagttc
8221	gtcataagca	tttattgagt	gcatactatg	tgccagggtc	tggttatatg	gctgggtgtg
8281	caatgatgaa	taaaacacag	tccctgcctt	caaggacctt	acagactggg	gagaatgtct
8341	gggagacagt	gtgatcaaat	gcctctgtag	atgggtcttg	cagtgaagct	atcagggtgc
8401	tgctgtgatt	agaggtgggg	agccttggat	tcttgagtaa	gtctcactgt	gacatcagct
8461	aagatggact	tttatgtgct	tcctttgaag	gcatcacgtt	gggtgggttc	catttagacc
8521	gaggccggtt	cagaacttcc	caaatgatgg	tcctcctcct	gacgttgtaa	atcaggacct
8581	caacaataac	ttacaggtat	ggagcctccc	acgaagccca	ggcgagcttg	acgtgatatg
8641	ccaggctctc	caatcctcaa	cctttagatt	gccagcttgc	ggtttaccat	tttattgggc
8701	taaatatttc	atgatttggt	cacatttctt	cttagagcag	cagctatttt	taaaacgtcg
8761	aatgtgccat	cacattctat	cacatatttt	tgacgtggca	atttgcat	tggcttaagt
8821	aaataacatt	tttttaaac	cactattttg	agcgttcagt	ggtctgtaac	agtgtgttat
8881	accataagaa	ctgggtatgaa	gtgggttaact	actagttaa	taatagttga	agcctgggag
8941	tggtggctca	cgctgttaat	cccagcgctt	tgggaggctg	aggcaggtag	atcacctgag
9001	gtcaggaggt	taagaccagc	ctggccaaca	tggtgacacc	ccgtctctac	taaaattaca
9061	aaaattagtt	ggcgctgcct	gtattctcag	ctgctaggga	ggctgaggcg	gaaggatggc
9121	ttgaccttgg	gaggtggagg	ttgcagtaag	ccaagatcac	accactgcac	tccagcctgg
9181	gtgacagagc	Ragactctgt	ctcaaaaata	ataataatag	ttgcagatct	agttgtttca
9241	tttgatattt	gctgccagga	gcagtcaaaa	ctatgacaac	atcaacacag	ttgtgctgtg
9301	gaagccttag	aaacagccct	atccagccta	gggcatcatt	ccctgggggc	ctggctgcct
9361	gctgtgtgtc	ctatggggca	gggggcaggg	atttaccctg	cccttctcta	acattatttg
9421	gtgttcatca	tagccctaat	tgttttctca	ttgtttcatt	acctcattgt	ttcattacct
9481	gtaggaaggc	actgatcctg	aaactgaaga	ccccaaccac	ctccctccag	acagggatgt

9541	actagatggc	gagcagacca	gccctcctt	tatgagcaca	gcatggcttg	tcttcaagac
9601	tttctttgcc	tctcttcttc	cagaaggccc	cccagccatc	gcaaactgat	ggtgtttgtg
9661	ctgtagctgt	tgagggcttt	gacaggaaty	gactggatca	cctgactcca	gctagattgc
9721	ctctcctgga	catggcaatg	atgagttttt	aaaaaacagt	gtggatgatg	atatgctttt
9781	gtgagcaagc	aaaagcagaa	acgtgaagcc	gtgatacaaa	ttggtgaaca	aaaaatgccc
9841	aaggcttctc	atgtctttat	tctgaagagc	tttaatatat	actctatgta	gtttaataag
9901	cactgtacgt	agaaggcctt	aggtgttgca	tgtctatgct	tgaggaaactt	ttccaaatgt
9961	gtgtgtctgc	atgtgtgttt	gtacatagaa	gtcatagatg	cagaagtgggt	tctgtctgga
10021	cgatttgatt	cctgttgga	tgtttaaatt	acactaagt	tactacttta	tataatcaat
10081	gaaattgcta	gacatgtttt	agcaggactt	ttctaggaaa	gacttaYgta	taattgcttt
10141	ttaaaatgca	gtgctttact	ttaaactaag	gggaactttg	cggaggtgaa	aacctttgct
10201	gggttttctg	ttcaataaag	ttttactatg	aatgaccttg	gcagagactc	ctgtcatcct
10261	agcagtttac	tctgcgtttg	ttgtatctag	acagtcaaca	actgagttgt	cgggttttaa
10321	cctgaatgct	tgtttttcag	aagaRgactg	tttgtgccgg	taagaatgat	caggtaaggc
10381	catgaaagt	tttgttgYg	ttttgtttt	tgagatgggg	tcttgccttg	ttccttgggc
10441	cagagtacat	tggtactca	caagtgggct	ggtagctggc	tacagcccca	gactcctggc
10501	ttaaagccacc	tcctgcctca	gccaccttgg	cagctgggac	tacagggcatg	cgccatcaca
10561	cttagcttga	aagttttaat	ttactaagaa	tatacctgtg	tttcccccca	tttctgtatt
10621	taaacagtac	tggtctatat	aggaacccat	caaagttaaa	ttccccaaat	ttaaatttag
10681	taaatttagt	ggtttcacct	tggaacatct	gcaatagttt	caccagctca	aatttcatgc
10741	ttttgtaagc	tgagcttatg	tttgtgattt	taatccttta	agtactactg	tggtactaa
10801	tcattttttt	gttttttttg	gtgggtgttt	tgtttttgtt	ttgagatgga	gtctcactct
10861	gttgcccagg	ctggagtggc	gtggcgcgat	ctcggctcac	tgcaacctct	acctctgag
10921	ttcaagcgat	tctcctgcct	cagcctcccg	aatagctggg	attacaggtg	cccaccacaa
10981	tgtctggcta	attttttgta	tttttagtag	agacgaggtt	tcacccatgt	tgccagggt
11041	ggtctcaaac	ccctgacctc	aggtgatctg	cccgcctcgg	cctcccaaa	tgctgggatt
11101	acagatgtga	gccaccgcac	ccagccaggg	actaatcttt	aaagcaaagt	tttatatatt
11161	ttacagtgtg	taatgttatg	tgtaggtggt	ctatttgga	aaataaatca	gcctttctca
11221	tcattgattgt	ggtcatttta	attaatcctc	atcggaacaa	ttgtttacct	aagataaaca
11281	ttactataac	aactcatagc	aagacgctgg	gtaggtacaa	agatgtctta	tgtgtggtta
11341	tgctttcaaa	gccaactgaa	accttttgt	aaggagttta	atagcaaaaa	gtttcaata
11401	actgtgtgct	tctagaacag	aactatcaga	aggcaatgaa	tattcacaaa	ttgtgaagag
11461	atagtttgct	tcaaggaaga	aatgacttgt	aactagagta	ggtatgaaat	gatgggggaa
11521	aaatgatgag	gtatgaaatg	actcaccttc	tctccagctc	aaggtaagaa	gggtggcagc
11581	aggagtataa	gctcagccac	aggacgtgct	cttctgcca	aacagctgga	tctgcacat
11641	gcttggaat	gaggtcctgc	tggttttaga	aaacaaacat	taagaattcc	caaagtcttg
11701	ggtggaagag	cctgttgctt	ttcagaggca	aggccatcac	catttgga	ggggcccaag
11761	gccccaggca	gctgtgtgac	catctgtttc	tgaaggagt	gggattttac	cccctgaaat
11821	gtcagtttgt	ggcttaaaact	ctgggttcta	caggcccaaa	ataaatagtg	ccaggaaagt
11881	gccccgaac	agagctaacc	agggttcaga	ttggcaccct	atccccactg	gggcaagcag
11941	gactcttagc	aattaaggcc	taagacggt	gacaggtggg	acatggcaga	aattcagtgc
12001	ttccaccaca	gctactcaat	gtgccacRat	catgggccac	acaccactct	gaatacttag
12061	aaaattattg	gtttgggctt	ttattattaa	gtagcaagta	aataactgaa	aaagcccag
12121	atttcagctc	tggtctatagc	agctttctaa	gtctgtgttt	ttaaagtgca	atttcttgaa
12181	tcctagtctt	gtagaagaaa	cactctaccc	ccccgcccc	cccccccc	cccccccc
12241	ctaaaaaatg	agcttcatga	tcaagtacat	tttggaaacc	tcaggctgat	ccaagtccat
12301	agattttctt	actgcaggcc	ttctgggtcc	tttaatatgc	ctgaagctgg	ggctttccct
12361	tcctgagaat	ggcccaggac	tatccatgtg	cctcattttg	ggaaatttag	taatgagtta
12421	ctaaatcaac	accacctttg	gcattctaca	tagcaaacat	actttgttag	atgtgacatt
12481	ttacacacta	accaatggag	ataaaatttt	ttaaatttat	ttttggccag	gcacggtggc
12541	tcattgctgt	aataaccagca	ctttgggagg	ccgaggcagg	cggatcactt	gaggtcaaga
12601	gtttgagacc	agcctggcca	acgtggcgaa	atcctttctc	tactaaaaat	acaaaaatta
12661	gctgggcgtc	gtcgtgggca	cctgtaatcc	cagctactcg	ggaggctgag	ggaggagaat
12721	tgcttgaaac	cgggaggggg	aggttgca	gagccaagac	cacaccactg	cactccagcc
12781	tgggcgctcag	agtgagattc	tgtctcaaaa	aataaataaa	tgatttctta	tttatttttt
12841	tttaccagt	ctctacatgt	tcagagaaac	ttctctggt	accaaccaca	gaaatgatcc
12901	ctgaaagtat	agtcttagga	gataaatatt	ctttacatag	ccaggaggga	gatgagaagc
12961	catacctgtc	tacagtctga	ctgacaaagg	aggaggctcc	aggccccctg	gagaatccca
13021	ggtttttatgt	aataattact	tggtcctttt	caaagtactt	ggatgagtg	aggatagtct
13081	ctttgtctta	tcagctagtc	ctgcaatcta	ggtgttctcc	cattttgtag	aggcttgcat
13141	agatgagaga	cctgtccaag	gtctcaaac	cctaactggc	agttctgaga	ctagaaatac

13201	tccctctcag	gagtgagcct	cctctacaat	tttttttagc	agtcctcatg	tgccaaatat
13261	ggcgtggggg	ccaggagaca	gaatgaggca	taggttgggc	gtggccctc	ccctcttggg
13321	tcttgtagtc	ggctgtgggt	ggcaagtaca	gcagYgatgg	cagacagggtg	tgatgagttc
13381	aaggacaggg	aaataacatc	cacagcccca	tcccagttact	cctgtgcagc	aatggaagtg
13441	tgccaccgac	acaggggcta	cagggtgagc	aggagtga	ggcgaagaga	ggaagagagc
13501	tctgcctgtg	caaaggcgga	gggaacatgg	tgtgggagga	actgaagaga	attccacata
13561	agtatgaaga	gggtagggag	attgagactg	gagaaaaggg	gaagccgggg	ctcccctttt
13621	gaccatgcaa	cgactggaa	gcacagcact	cccagcctca	gggtcctcca	tgatttgaga
13681	ctgacaRtga	attcagagga	gcttggtgaa	gtcaccaggt	caggtccaga	aatcctgcag
13741	tgcatccctt	ccgttaccct	tgtcataact	gggagaagac	accaccaca	tgacgcaggg
13801	gagagtgcag	gcatgagcta	gcaccatata	tgtccctgc	atctgtcctt	ggctatgttt
13861	tacaccccc	acccttaga	acattgtagt	caaactagga	tgtattaaat	tggctggttg
13921	ctcccaacta	cactggacaa	agtgagagaa	aaaaaaaaag	gaggagctca	aggtttcaaa
13981	ttcccagctc	aagctctgca	taaaaactgc	tgtgacttcc	ttagaagaga	cccctatctc
14041	ctgtagctgc	agggttgaga	tttctgagct	caagtgtatc	gcctgcctca	ccctcccaaa
14101	gtgtctgggt	tacagttgtg	atgccaccctg	cctggccagg	gctgagattt	gtgaaaaagga
14161	aaccctaaagt	ctcatcttgc	atgtggctga	attatgtcgc	aaatccaatt	cccaatttcc
14221	agccttgtag	ggtgtcttca	gttaaagtga	ggacaacttg	aaaaatcgga	tgggaacata
14281	agggaaagatt	ccagtaaagc	tggggacatt	gaatccctaa	attctgtYat	gttccctgcc
14341	agtagaaaca	gcccattctac	ccctccctgg	gtccagctgt	gtggacacag	attggcagcg
14401	agtgtgcagg	tggtatttcc	ctacccttgt	aatcatcaca	cttctttttt	ctttttcttt
14461	cttatttttt	tgagtcagag	tcttggtctg	ctgccagagc	tggagtacag	tgggtgcaatc
14521	tcagctcact	gcaacctccg	cctcctgggt	tcaagcaatt	ctcctgcctc	agcctcccca
14581	gtagctggga	ctacaggcgc	gcaccaccac	accagctaa	tttttttgta	tttttagtag
14641	agacagggtt	tcacccccaa	tagccagggt	ggtctcgaac	tcctgacctc	aagagattca
14701	cccaacctcg	cctcccaaa	tgctgggatt	acaggcgtaa	gccacYgtgc	ctgacctcat
14761	cacaattttt	tagccctttg	agaaaccctg	tggccttccc	tgaggtagct	gtcttgccgg
14821	gcactttctga	ttcttcttgg	atcctatgcc	cttccctct	ttgctggacc	tgtaactaga
14881	ctcaagtccc	accaggcccc	agagagaaag	gtacacactg	tgacccatga	agagggtgtg
14941	tacacaccaa	aagaactgca	tgatttttcc	aatttatata	gacaaatcca	agagaYatgt
15001	atgggagtag	attttaaggt	tgtgagatca	cggaaaggacc	atagtgttgg	atctggctga
15061	acgtaatgat	atggggccac	taagcagaga	ttcttaactc	agtgtcttag	catgaggggt
15121	tagaaagggc	tctaacttgg	ttgggttgggt	gtttggttcg	ttggttgggt	ggctggctga
15181	aacatggacc	aaaaggtagg	tggccgacac	cgttccttat	tttgttatta	atatatttgt
15241	atattcatat	acaaacttgt	atgctatgat	atctaataca	tattacagat	ataaaacaaa
15301	tcttttaggcc	aggcatgggt	gctcactcct	gtaatcccag	cacttcggga	ggctgaagca
15361	ggtggatcac	gaggtcagga	gttcaagacc	agcctggcca	acagagtga	atcccatatc
15421	tactaaaaat	acaaaaatta	gccggtcacg	gtgtcaggca	cctgtaatcc	cagctactca
15481	agaggctgag	gcaggagaa	tgcttgaacc	cggaaagggtg	aggttgaggt	gagctgagac
15541	cccactactg	cactccagcc	tgggtgacag	agcaagactc	cgtctcaaaa	aaaaaaaaaa
15601	tcttttgttt	ctttctctc	tcattccttt	atcacctaac	ataagatgga	tcatcacagc
15661	attgaagtga	caggatgtca	agcagaagag	taaacatcac	ccaaggacgt	tcagcctct
15721	ctggggaaag	gattggcatg	ttttctgttg	tatgcaggat	gggttagtca	tgtaggtgg
15781	aagtatggct	ttgttactgt	ctttatctgg	agattaaagt	tggtttaagg	agatgcatac
15841	aggtgccagg	ttgacaaaga	gagtactgta	atgattagtt	ttatgtgtga	acttggctag
15901	gccagtttat	gtaaaacacga	atctaggccg	ggctttgggt	gctcacgct	gtaatccag
15961	caatttggga	ggctgaggca	ggcggatcac	ctgaggctcag	gagtttgaga	ccagcctggc
16021	aaacatgggt	aaaccccatc	tctacaaaaa	atacaaaaat	tagcctggcg	tgggtgtgtg
16081	tgccctgtagt	ctcagctact	cgggaggctg	aggcaggaga	atcgcttgaa	cctgggaggt
16141	ggatgctgca	gtgagtggag	atcatgccac	tgactccag	cctgggcaac	agagtgaac
16201	tgtatcgcaa	aaaaacataa	aagaaaaaac	aacaaaaacc	ccgtgaatct	aggtgttact
16261	atgaaggtat	tttgcatagt	tgattaacct	gcattggcct	catctaatta	tctgaaagac
16321	cttaattgca	aaactcagg	ttcccaagg	acagagcaat	taagtctatg	gcctgcagcc
16381	tcagcttccg	cctgagtttc	cagcccacca	tcctacccta	cagcttcaga	cgctctagc
16441	cagcccctac	aactgtgtag	gacaatttct	agaagttagt	taatgaatac	gctattggat
16501	ctgtttctct	ggaggaaccc	tgactgacac	aggggcccgc	tctggaggtt	gtgggttcca
16561	gttccttctc	cctgtgtagt	gtattggcca	gttgggggtg	gaattgcttc	caggcaggct
16621	gtgtcatttg	ttcaggcagg	gtcccctccc	cttggctctg	cctgagagca	aaggcagggtg
16681	ggggtggccc	tggggagggc	ctgaagcttt	gctctgtgcc	tcctaaagct	ttcccactcc
16741	agggaccag	ccaggcaggc	tggcaggaa	aggcaggctt	catctggaag	gatgtctcca
16801	gggtggaaat	gatgagattt	aaatgggtga	gggacccgga	gggtgggggtg	ggcagcacc

16861	actgaccag	ctgcagagtt	ggaccctctg	aagcccatg	tgtacatgag	aatctgtgtg
16921	cctgattgag	taggtgccta	tacatggata	ggctgcgaat	ctgtgtgcac	acagctggct
16981	ggagagcaca	tgahtaggt	tatgtaccac	attgtcagca	ctcaccatt	agctcctggg
17041	gactcacttg	ctgcaggtga	tccctgtcct	cgtgggctct	acaccctggc	aggtcaacac
17101	agactacaaa	gaaacaagcg	gacataaaat	gacaagggt	aggacaaaa	gcatggaaag
17161	gagaggggat	aacgtggcag	gggacatttt	agaatgcagt	ggtttcgaca	ccaggaggag
17221	gagtggtag	acagtggctg	gggagggcct	ctgaagaggt	gacacctgaa	tgatgagctg
17281	gagcaaacca	agcaaaagatt	ggaggaagag	cctccaagca	gaaagaactg	caaggacaaa
17341	ggccttggg	caggagcggg	tacgtgtgtc	ctgtatgtgt	gtgtcctgca	cggtggcagg
17401	tgtctgaagc	tgagcccaga	ggagctgtgg	agatcaggcc	cagaagtggg	gccacagcac
17461	gtagggccag	agacctgcag	taagaaatgg	gatgtgtgtg	agatgggatg	ggagccaccg
17521	cagcaccatg	gggcgggagc	agcagagtct	gatgtgtgtg	acttcaggga	gctggagtgc
17581	tatgaaggaa	gagcgaggag	gcattgtggg	ggaagaacac	cccactgag	gcctgcaggg
17641	aaggcagcag	accccaggtc	agagcatgaa	ggtagagggg	aggttccaag	aagtgggttg
17701	gggaataaag	actggatggc	tgatgacaga	gggcagggtg	gaggatgcgg	ggccaggagg
17761	ggctgcacag	agtcctggga	gggtgagcgg	tggcctggc	tggctaggag	gcccaccctt
17821	gaggtgtctg	tgagggatac	ggcgaggaga	aggtggatgg	tctctctga	tgacaacctt
17881	cttgcctggc	ttagactgaa	aggggaggtg	attttagagg	atgaggccag	aggggtgtgc
17941	cccaggggag	ggcaccagat	gtggggcagg	agagctgtgt	ttagttgcag	ccgtggggcc
18001	tagaggaagt	cacagcaccc	cactgaattc	tcacttcctc	atcataacag	accctgtgac
18061	atataaaacc	tgctctgccc	accgcacagg	gatcacaagg	ctggagtga	ataatggagc
18121	acttccccag	agtggcacac	gggaccagg	gacgggtgtg	caaaaccgtt	ctaggtggaa
18181	gaacaccttt	ttttctcttt	tcttttctt	tcttttctt	ttttttttt	ttttttttga
18241	gatggagtct	ccgtctgttg	cccaggctgg	agtgcagtgg	tgcaatcttg	gccactgta
18301	gtccctggct	cccaggttca	agtaattctc	ctgcctcagc	cttctgagta	gctgggacta
18361	caggcaccca	ccacaacatc	tagctaattt	ttgtattttt	agttagagaca	gggttttacc
18421	atgttgacca	gactgggtct	gaactcctga	cgtcaaggga	tccatctgcc	ttggcctacc
18481	aaagttagctg	ggattacaag	catgagccac	cgtgcaaaag	caaaaacact	tgattataat
18541	agcatgctat	ttttcaatgt	attagataaa	tgtattttcc	atttaaagtg	gggatataaa
18601	gtcccccttt	aaaaaccaca	taagtaaaaa	agtcagtctg	tttaaaaggt	taagtaaaata
18661	acagtctagg	gcagatgcac	aaaagacagc	atcatgaccg	tggttcctga	aggattaagg
18721	ttgcaggaaa	cactgaatgc	taaaagcttt	gtgaatgtat	agtcctatga	aatgtctttt
18781	aaaaaatgag	gtgcatacca	agatgtttga	gtgtgtgtat	ttggggtagg	tgctgtgggc
18841	atcagggtgt	acctgtgtgt	gtctcacaag	cagggtgtagc	tgggtgcttg	tggtgatgtg
18901	gtgtgtgtgt	atctgtgcac	acgtgcatac	ctgtgccca	atatccatgc	acacgtcctc
18961	ataaggctct	ctgcggccag	gtgcgggtgg	tcacgcctgt	aatcccaaca	ctttgggagg
19021	ccgaggcggg	gggatcacga	agtctgaagt	tcgagaccag	cctggccaag	atggtgaaac
19081	cccatctcta	ctgaaaaatac	aaaaaattaa	gacagtga	gttgatcgtg	aagaagggaa
19141	gatgaatctg	gggattaggt	gggaggaatg	gggtgctgtc	aagatgaaaa	taaaactagg
19201	gtggagaggc	tggggcaaaa	gagaggccca	acagtatgat	ttgccccagt	gcggggactt
19261	tgtgcctggt	gatttgaggt	ggcagggtct	ctaccagggc	ctgatgggag	ctgggattaa
19321	aagcagctgt	gacctaaagg	aggccattgc	tctgtggcct	Rctcccctaa	ctcttttgca
19381	gaaagtccca	ggctaagaga	tgggggatgg	ttgtaatgac	ccctcccaga	aatctgggct
19441	ctgtcctgca	gaggtggggc	ccggggatca	agacgcctct	aggttcaaga	gagaggcaga
19501	atgaggggtc	agccagctgg	ggcagggaag	cttcactcta	gggtgcaagg	agagaccttt
19561	cgcttgact	ggaaggacgt	gaggagcctg	tggcctcctg	tttgcaacca	agggctgagg
19621	aaggggccc	gcattcctgc	tgtaggtcaa	tgacctggag	aaacacatgc	ttgaggacag
19681	agctcagatc	attgtcccag	cgcaaacctt	ggtgggatgt	aaggtttgga	gcttcttaag
19741	ttccaagagg	cagtctcatg	cagttcaagg	agggctggag	aagcctggtc	tgctcatggg
19801	agtcaattgt	taaattttca	ggaattttgt	gagccaatta	ttgaacacag	ctattattaa
19861	aaacaaaatt	ataggctggg	cgtgatggct	catgtctgta	atcccagcac	tttgggaggc
19921	caagggcggg	gatcacttga	ggtcaggagt	tcaagaccag	cctagccaac	atagcaaaat
19981	cctgtctcta	ctaaaaatac	aaaaacatta	gtcgggtgtg	gtggctcaca	tctgtaactc
20041	cagctacttg	tgaggctgag	gcatgagaat	tgcttgagcc	caggaggcag	aggttgcaat
20101	gggctgagac	cacgccattg	cactccagcc	tgggcaacag	agggagattg	tgcttttcaa
20161	aataataaaa	taaaataaaa	taaaataata	ggctgggtgc	cgtgactcac	gcttgtaaat
20221	tcagcacttt	gggagaccac	ggctggaaga	tcgcttgagc	ccagaagttg	gagatcagcc
20281	tggggaacac	agggagaccc	tggtctgtac	aaaaaataaa	aacaaaatta	gccaggcatg
20341	gtggcacatc	cctgtgggtc	cagttactta	ggaggctgag	gtgaacaaag	tttaactca
20401	aaactcatca	cttgtgaatt	actttgctac	agtgactat	tattattatt	tattattttt
20461	tactgggacg	cctcttgagc	ctaagtaggc	ccagagactg	tccagcatac	tattattgat

20521	gctttgtggt	tattgatatt	gattggatcc	gtatagtga	aatggctata	ctgtagaatt
20581	gtgtgctact	gtgtatttct	taccaattct	gcattcagtg	gcatacacatt	catagcttga
20641	agttggccat	ggtgggaggt	aaatatgtgt	ggtataaatt	ggcaaagact	acagattggg
20701	gttcctgtct	ggccccccaa	gagctggttg	ttaaactttt	accagcacac	cactgagttg
20761	gagtctggaa	agcaggcttc	gtccaggttc	tgccctgcta	gctcaactgg	ctctcaaagc
20821	tttgctccac	caactggcct	atggctgctt	ccactcacca	attctccctt	ttgccctcta
20881	aggccacctc	ttccagggaag	tttccccga	tttctttgcc	tggaacttcta	aaattctttc
20941	tttgccaggc	gtggtggctc	acacctgtaa	tcccagcact	ttgggaggac	gaggtgggca
21001	gatcacttga	ggtcaggaga	tagagaccag	cctggccaac	acggcgaaac	cccgtctcta
21061	ctaaaaatac	aaagattagc	tggacatggt	gacgcgcacc	tgtaatccca	gctactcagg
21121	tggctgaggc	aggagaatca	cttgaacccg	ggaggcagag	gttcagtgga	gccaagatca
21181	caccattgca	ctccagcctg	ggcaacagag	ggagactcca	tctcaaaata	aataaataat
21241	taattctttc	ttacctcttc	cgttcatatt	catacagaat	aatctccaca	tctcgaaatt
21301	cttaactgat	tagctagttc	ttgctattaa	ttaaatacgt	gatgcatatg	gccaagcttg
21361	gatggatgga	atccctgtat	tggtaagggtg	ggaatttttc	ttttcttttt	tttttttttg
21421	agaccaagtc	tcactctgtc	acccatgctg	gagtgcattg	gtgtgatctt	ggctcaccac
21481	aaactctgcc	tcccagggttc	aagccattct	cctgctcag	ccttcttagt	agctgggatt
21541	acaggcacac	accaccaagc	ccagctaatt	tttgtatttt	tagtagtgac	agggttttgc
21601	catgttcgcc	aggctgggtc	ggaactcctg	gcctcaatg	atctgccccac	ctcagcctcc
21661	caaagtgtcg	ggatcacagg	tgtgagccac	cacgcccacc	taggggtggga	attttccacc
21721	tgggttctgg	gctcagctct	gccacagatt	cctctctctg	ggcttatcct	ctgaRggcga
21781	gattttggca	tgactgagtg	gatggaggaa	gaacttgggg	tcagcgggct	gtcaccctgc
21841	tctgcccgtg	aaccgactca	acaacagggc	cacaacaggc	cttgttggac	atggaagcaa
21901	atgagaaaat	tagtaatact	gattcagtgt	ttacttaagg	ttctgatact	ttgtccatta
21961	tagacctttt	gcattaattt	tgatttttta	ttatataaaa	tatatatata	acataaaatt
22021	gatcatttta	gccattcgaa	gtgtacagtt	ttgtggcgtt	taatacattc	acattattat
22081	acaacccact	tccagaactc	ttttcacctt	gaaaaactga	aactctattt	ccattaaata
22141	tgaactcact	ccccgttctc	tcttctccca	gcctctgggtg	acctccattc	tattattatt
22201	attattatta	ttattattag	agagagtgtc	cctctgttgt	ccatgctgga	gtgcagtgat
22261	gcaatcacag	ctcactgtag	cctcaaactc	ctgggctcaa	gggatcttcc	cacttcagcc
22321	tcctgagtag	ctgagattat	aggcatacgc	caccacactc	tgctaattca	cttatttttt
22381	ggaaagatgg	ggtcttgctg	catggctcaa	gccagactta	cattcctggg	ctcaagcgat
22441	cctcccacct	caacctccca	aaacattgag	attacaggtc	tgagccaccg	caccctgccc
22501	attctacttc	ctggctctta	aatatgacta	ctctagatac	ctcatataag	tggaatcata
22561	cagtatttgt	ctttgtaact	ggttcatttt	acttggcata	atgtcctgaa	ggttctcct
22621	catcgtagtg	tgtgtcagaa	tgcccttcct	tttaaaggat	gaataatatt	cccttgtgtg
22681	gatatatcac	atgttgttta	tccactcaat	attgatggat	gcctgtgttg	cttccacttt
22741	tggtgtctat	ggaaaaatgct	gctatgaata	cgggtgtgca	aatattcatt	tgagtccata
22801	attttgattg	tttttctttt	ttgagacaga	gtctcacact	ctgtgccagg	ctacagttca
22861	gtggcgcaat	cttggctcat	tgcaacctcc	acttcccggg	ttgaagtcac	tctcctgcct
22921	tagcctcccg	agtagctggg	attacaggta	tccgccatca	cacctggcca	atttttgtat
22981	tttttagtaga	gacagggttt	caccatgttg	gagactggtc	tcaaattcct	ggcctcaaat
23041	gatccaccca	cctcggtctc	ccaaagtgtc	gggattacag	tgagccacca	tgccgagtcc
23101	ataattttga	tttttaaatg	gtggctacta	agtttttctg	gcacccctta	aattttgtca
23161	ggcacttgcc	ttacctagtt	cctggcccca	gtttgggttg	tcacagcaag	gtggaagtgt
23221	actgaaaagc	tcgtgtttta	tctttatacR	tttacctggg	gccccaaaaa	gggggaaaac
23281	ccactttgat	agggatatga	cacagggacg	caggagccaa	ccgaaagagc	ccccagtggc
23341	caaagatgga	gcaacttgag	caacaaaata	aataaagtaa	gcatacaatt	atagcccaaa
23401	gtataaaaata	agtgctctatg	agtctatact	cacatagatg	atttaataca	ttcatattaa
23461	taaatgggag	agcactttga	gaggccaagg	tgggcagatc	acttgagccc	aggagtctga
23521	gaccagatta	ggcactgtga	tgaaaccttg	tctctaccaa	aaacacaaaa	attagctggg
23581	catggtgggg	catgcctata	gttccagtta	cttgggaggc	tggggaggga	ggattgcttg
23641	agcctggggg	acggagggtg	cagtgaagtg	tgatctcacc	actgcactcc	agcctgggca
23701	acagagtgag	gccctgtctc	aaaataaata	aatatataaa	taagataaat	atataataaa
23761	aaataaaaaat	aaacgggaaa	gaagagacaa	atcttctgtg	caggagaaatY	ccaaatgaat
23821	tctgtagatt	ctccacccta	caggagggca	cacacaactc	caggctgcct	tagtgacctt
23881	cttccaaaaga	gtacagtcacg	ggaaggggga	gcggggagaa	tttaacttcac	agtggagaaa
23941	tctgacaaat	acgacctccg	ccaagtgtac	gaggtcacat	cagctgtcat	gaattatggt
24001	gatagtgggc	atcctgggata	tgatgggatg	aaatggcact	ttacctccac	gacccttttc
24061	acaacagccc	gtaatgccag	tataaggaaa	acatcagacc	aggagtgggtg	gctcacgctt
24121	gtaatccgag	cactttggga	ggccaagggtg	gggtggatcac	aggtcaggag	tttgagacca

24181	gcctggacaa	catggtgaaa	tcctgtctct	actaaaaata	cacaaactag	ccaggcacgg
24241	tggcggtg	ctgtaatccc	agctacttgg	gaggctgagg	cagaaqaacc	gcttgacc
24301	gggaggcg	gglttcagtg	agctgagatc	gcgccactgc	actccagcca	ggttgacaga
24361	gtgagactcc	atctcaaaaa	aaaaaaaaaa	aaaagaaaag	aaaagaaaaa	gagaaaagaa
24421	aaacatcaga	cagatcccaa	cagaaggcca	tcctacagta	tacRtgacca	ctgctcctca
24481	aacctgtcaa	gactatcaga	aacaagagaa	actgtcacag	ctacaaggag	atgtgacaat
24541	taattgtgat	tttttttttt	gagatgtggt	ctcgctttgt	caccagggct	gcagtacagt
24601	ggcacaatca	cagctcactg	cagcctcgaa	ctctggggct	caagtgatcc	tcccatccat
24661	ctcagcctcc	caagtagctg	gggctatatg	ctgtcaccac	cacaccagc	taatttttgt
24721	attttttttag	agacggtatt	tcgccatggt	gccaggctg	gtctcgaact	cctggattca
24781	agcaatccac	ctaacttggc	ctcccaaagt	gctgggatta	caggcatgag	ccaccatgcc
24841	ttgccaaatg	tgatgtattc	ttgatgggat	cctggaagag	gaaaaagata	ttaggtaaaa
24901	actaaggaca	tctgaataac	ctggatttcc	agtaatgtat	ccacactgat	tcatttaattg
24961	taacaaatat	accgtatgaa	tgcaagatgt	tcataatgag	gccggggcgg	tggctcatgc
25021	ctgtaattcc	agcacttttg	gaggctgagg	cgaaggatc	tcttgagctc	aggagtccga
25081	gaccagcctg	ggtaacacag	tgagatcccc	atctctacaa	aaaatttttt	gaaattagcc
25141	aggtgtggtg	gtggcacatg	cctgtagccc	cagctactca	gaagactgag	acaggaggat
25201	tgcttgagcc	gggaggttga	ggctgcagta	agccaggatc	acgccactac	actgcagtct
25261	gagcaacaga	gcgacaccct	gtctcaatga	taataataac	aataataata	ataatggaaa
25321	ctcagtattg	gttgatatg	ggaaacttgc	tcagtttctc	tgaaaaatcta	aaattcttct
25381	gaaaatcaaa	gtctgcttaa	aaattcacat	ggggtttgca	ttctcctcca	tgacaagggt
25441	ttcaggttta	tgattacaga	ggctggagag	ggtgcaggtt	atcccccccc	tccctgtccc
25501	agggattccc	ttccccagga	gctgtgtctc	ccctgtgaga	gagggtgagc	ttccatgacc
25561	ccaagcctct	tgccctctga	ctccggtatt	cttagaagct	gggaccagca	ctgagcccaa
25621	attcccgaa	cgctcaata	ctggctttct	gtccctatgt	gacctggagc	ttgtagttaa
25681	acttctctct	gcctcactgt	ttgacctata	aagcaggcca	atcaaggcat	cccgggggtg
25741	gctatgaaga	gtgaatgaga	tagcagacaa	cccagatgcc	taccgacagg	tgaagggacc
25801	aacacagtgc	ggtataggcg	tataagggaa	tggagtatgg	acacagccta	caacacagac
25861	aaaccttgaa	gacattcctc	taagggacat	aggccaggca	tgggtggctca	cacctgtaat
25921	cctagcattc	tgggaggccg	aggcgggcag	atcacttgag	gtcaggagtt	gagaccagcc
25981	tggccaacat	ggcaaaatcc	cgcccttact	aaaaatacaa	acattagctg	ggtgtggtgg
26041	taggtaccctg	taatcctgga	tactcgggag	actgaggcaa	gagagttgct	ggaacccggg
26101	aggtggaggt	tgcaagtggc	cgagattgtg	ccactgcact	tcagcctggg	cgacagagcg
26161	agactctgtc	gaaagaaaaga	aagggaggaa	ggaaggaaga	aagaagggga	aggggaaggga
26221	agggagggga	ggggaggggga	ggggagggaa	gggagagaga	aagaagaaaag	agaaagaaaag
26281	gaagaaagaa	aaagaaggaa	agaaagaaag	aaagaaagaa	agaaagaaaag	aaagaaagaa
26341	agaagaaaag	aaagaagaa	agaaaagagt	gaacccagga	acgaaaagatc	acacacactg
26401	tatgactcta	tttcatatgaa	atgttcagag	taggcaaatc	catagagaca	gaaagcacat
26461	ttatggttgc	caggagctgg	gaaaggcgag	gatggggaat	gactgtttat	tggatgtggg
26521	gctctatttt	gggggtgatga	gaatgttctg	gaattaaatt	catggctgca	taacactgtg
26581	aacatactaa	atgccctctga	attgtacact	ttaaaatggt	taaaagtggca	agttttcact
26641	aagcagtaaa	ttaaattcta	ctacaatttt	aaaaagacta	aaaaataatt	taaaaaagat
26701	taaatgagat	aacgcaaaaa	agcattatct	cgaaaataca	gctgatatta	gtataattct
26761	tactaagttt	taagagtcta	aggtgcagga	ttctaagttt	aaagggatag	gctcttttgg
26821	ttttttggtt	tagttatttt	gttttttttt	ttaatccatt	atccccaccc	ttgggaggcc
26881	cccagcacc	agtctgcact	agaggatggg	gcccacctcc	ctttctctc	caggcccagc
26941	cactgaccac	cagtaccctg	gccaggggca	ccctcggtca	ttgccctccg	tggcccaagg
27001	aagggaacag	aaacaacagc	caagaagaca	atagccgccc	ggaagtctct	acattttctg
27061	agaaatagag	cccattaatg	aatgaagttc	ctccagcctg	atcggaggac	ggggtgctgg
27121	ggaggcctgg	gctaaagggc	tcacctccag	ccccaccct	ggcaggggccg	atggtacatg
27181	ctcactcagt	gagggggctc	cagagggtctg	tgggtacgaa	cccaagggct	ggtgcccagg
27241	ggcaatcagc	ttatgtctct	gagccttggg	aaacagttag	ggtcagcccg	gctccccacg
27301	tgcttctggg	cagctttggg	attggagcag	gtgcaaaactc	Rggactaggg	caggaccccc
27361	tgagaggcga	ctgagcaagg	ccatcccgc	tcagtgttcc	ttggccctgc	ccggggcaca
27421	gcacccctgc	cacatccctg	cagccctggc	tccttctctg	gggctctgag	gaggcagcac
27481	ttggctcatct	ggctcacagtt	gctgcagggc	agtctcttgc	cccagctgta	ggtaaaagtac
27541	tgatgttgg	aattttttga	aagataaac	gttcacacaa	ctcagaattg	aaatgccaca
27601	gacattcccc	ctgctccgcc	cctttccccc	ggataccacg	tttctccggg	aggcagccaa
27661	tgatctcaga	ggctgtatac	ccccccagag	ttattttatg	catatcaagg	aaagtctaca
27721	tagaggactg	tttctggggg	acccagatgc	agcgtcaaat	gccatggaat	actacagtga
27781	ggacattatc	ctttcaagct	ttcaaatcag	agcaagggaa	aggtcgatgc	tagagtttct

27841	ctagcaccca	tgaagccctc	tccctttttc	tactgagttt	tactttacag	gcaacagcag
27901	gcttcaagct	tggggtcatt	gtcgggcaac	agtatctggc	aagaattcaa	tgtctttttc
27961	tcatagtcac	tgtatttttg	cctcttttcta	tttatggcaa	ctgagagaga	aagcttattc
28021	ctagatatat	gtattttaagt	aaaaataaaa	tgaattcatg	gaaacataatt	aagcaattat
28081	ccagataaca	taagggatgg	caaaaatggg	gcagatgggt	gaggggagac	aagtagaagt
28141	tgggggtgctc	ttgttgaaatg	tctggctctg	aactctagag	gaggccgcag	gggctgggca
28201	ggaaggaggt	gaatctctgg	ggccagggaag	accctgctgc	ccggaagagc	ctcatgttcc
28261	gtgggggctg	ggcggacata	catatacggg	ctccaggctg	aacggctcgg	gccacttaca
28321	caccactgcc	tgataacccat	gctggctgccc	acagtcctga	ccctggccct	gctgggcaat
28381	gcccatgcct	gctccaaagg	cacctcgac	gaggcaggca	tcgtgtgccg	catcaccaa
28441	cctgccctcc	tgggtgtgtaa	gtatcagtc	atctgtctgc	cctgccaggg	gtcttttcat
28501	ggacacccac	tatgccagga	gcctccctgg	cctgaagcca	gccctgaagc	cggctgccac
28561	actagccacg	agagaggagt	gcctgggag	ggagatgggc	tgagYggagc	tgtcatcacc
28621	ccctcctgac	ctcgcttca	aggtcaagtt	ccttggtRag	aaggtcctag	ctgcattgca
28681	aacagccagg	tatagggatt	tgtgtttgtc	tgagacccag	aatcactggg	gttcRagtta
28741	gggttcagat	ctgagccagg	ttaggggggt	gagtcagggg	gtaaagatta	ggaggttggg
28801	gtatatttgg	tgttgggggt	cactctatgg	ccaaagtcag	gggttgccat	gagctcaggt
28861	gacggaggct	ccatcactga	ctgttgtgtg	actttggcca	gctccctgc	cctctctggg
28921	cctcagtcct	ttgctcaata	taataagggt	atagggaggc	taaatgatac	aatttctaaa
28981	atagagtatc	gccaaagtca	aaagccagaa	ttatagaccc	ccaggactac	agacagtgct
29041	acagcatcgt	ctgggtgagg	ctagggttag	tgtgcggctg	ggctcagggc	tgccccattt
29101	gctaggatcg	tggggttccc	atgtgtcagg	atccagaggc	tagggatga	tcaggatctc
29161	tagctgggggt	cagggtcaga	gctctctgtg	tcccttagaa	ttgccatcaa	ccttaaacc
29221	agagggaggc	ccagtccaac	ccctcagctt	taagacctgc	tgggagcctc	atctcagaga
29281	ggctgagtc	tggccaaggc	cagttggggg	tgggagcagg	gggcttgggt	tgggctgca
29341	gccccctcatc	cactgccctc	ccctctagt	aaccacgaga	ctgccaagg	gatccagacc
29401	gccttccagc	gagccagcta	cccagatctc	acgggcgaga	aggccatgat	gctccttggc
29461	caagtcgaat	atgggttgca	caagtgaatc	gggcctcggg	tgtgaccagg	ctgggggtag
29521	ggaggcgagg	ggaacagcct	ggggcttgcc	cccagcccac	agggaggaaa	ggcagagct
29581	gggggactca	ggtctctccc	cttgatttgg	aaccagagcc	tgacaccttc	cctaccccca
29641	ccctccatcc	cctggtgccc	tggggggatt	tattggagtR	tatcaacctc	tccaacagcc
29701	cctctaagag	tcaggcttca	aagggtcctt	tcccactgcc	ctgggaagat	ggaggtctta
29761	tttcgggggtg	aatggggggg	agggtagaaa	aatctcaaca	aaataagtat	tttttaaaaa
29821	aatgtataaa	tgttgttttc	ttatagtaca	gacaggtcct	gctatgttgg	ccaggttggg
29881	cttgaactct	tggcttagcc	agtccccac	cccaagccta	aaattagtat	cttgacttta
29941	tttgggagta	tggtaacagt	caagggctcg	ttgtgggcca	ggtgctttta	caaacaYat
30001	cctcaccttt	atcatatatt	tttttcttct	ttgtttttca	ttttttgaga	cagagctctcc
30061	ctctgtcact	taggctggag	tgcagtggca	caatctcagc	tcgttgcaac	ctccgtctct
30121	gggttcaagg	aattttctgt	cctcagcctc	cagagttagt	ggaattacag	gcacacgtca
30181	ccacatccgc	gtaatttttg	tatttttagt	agagatgggg	tttcatcatg	ttggccagac
30241	tgtctccaa	ctcctgacct	caagtgatcc	gcccacctca	gtctcccga	gtgctgggg
30301	tacaggcggt	agccaccacg	cctggccctt	tatctatctt	aatctttatt	ttattttatt
30361	atttatttat	ttattttatt	atttatttat	ttattttatt	attgagatgg	agtctctcac
30421	tgtcacccag	gctggagtgc	agtggcacga	tctcagctca	ctgcaacctc	cacctcccg
30481	gttcaagacg	ttctcctgcc	tcagcctccc	tagtagctgg	gattacaggt	gcccaccacc
30541	acgccccggc	aattttttgt	ttcttagtag	agacgggggt	tcacatggt	gacctggttg
30601	gtcttaaaact	cctgacctca	agtgatccac	ccgcctcggc	ctcccaaagt	cctgggattg
30661	caggcggtgag	ccacagcgtc	cggcctatct	taatctttat	catatatttt	agcctcttct
30721	gtaaaagagg	ataatgccat	cggccggatg	accctgctta	acaaacacgg	aaacaggagc
30781	cgatagaggt	ttagcagcct	ggcggagctc	atgtgcaaac	tcagctcagt	atcggaact
30841	cagccacctt	catggcacct	caggctgccc	tggagcctgg	gtcccggctc	gtgtgtcggg
30901	ctgaggcccc	aagggtgggg	cagacattgt	tcaggggacct	tgtctttgtc	ttaaagccaa
30961	tctcctcctc	ctccccggcc	ctgctaaaca	cgctccccag	gggtggtctc	tgctaccgcg
31021	gcacattggg	ccttgagtct	tggtaaatgt	ttctgagcca	ccagggggcg	ccagcggtgc
31081	tggatgccac	ttcgcccttt	gcaggaaaaac	tcccgcgct	agcgggtgct	gtggggcgct
31141	ccaggtctcg	cgcagccacg	ccctctgtgt	gaccttgggc	ttcagtttag	gcttctgtaa
31201	aagagaataa	tgggcaaggt	ccagtggtct	atgcctgtga	tcccagcact	ttgggagggc
31261	gaggtaggag	gattacctca	gccaggggtc	aagaccacct	gtctctataa	aaaatttaaa
31321	aattagctgg	gcatggtggg	gcgtgcctgc	agtcccagct	actcaggagg	ccaggggagg
31381	tcaaggctgc	ggtagctat	gattgcatca	ctgcatcca	gcctgggtga	cagagcaaga
31441	ctctgttgct	aaaaataaaa	agaggataat	gctatcctag	acctatgtgt	tgcaagaggt

31501	cagacatggc	aaaagcgttg	agaagttaaa	gaaatagtat	ccttaataaaa	tcagcaataa
31561	ttcagtaaga	ccagactgcc	atagactaga	tgtcatagtc	attaatatat	aactgttatc
31621	ccaaacgtat	atgagtgggg	tagaaataaa	atatgattgg	ccataactat	gattggtcat
31681	gattaatggt	agatgaagtt	ggataatggg	taagatgaga	attcttcaca	ctattctctc
31741	taaagcgaat	ggaataaaaat	agaacagaac	agaccgggaa	agccagatat	atgtggattc
31801	tccttgctgg	gcacagtgtg	tcatagtggc	ttataatatg	ggatttggag	tgggatggac
31861	ccaggatcaa	attcccttct	actgaggttt	tctgaagcca	cataagctgt	ctgagccatt
31921	tctgtctcag	ttcagtgggt	acagcaatag	tgactacctc	gtgggtagct	gtgaggatta
31981	aaccaggaaa	tgtgtataaa	ctctaagcac	agtgcctgcc	acacagcatg	tgtttggtag
32041	gtgatggccg	cttctattgt	gtcatattcc	atgtgctcaa	gccggggcct	gggggagagt
32101	tcagcaaggg	tagagggata	tgagagtga	tgtggccac	tggtctccct	gcctgcagtc
32161	tctctctctt	gatccttgct	tcctaagggt	cttcaactag	ccccacctct	gaccaagtcc
32221	ccggcggcac	aggcagcaca	gtacctctgc	tgtacctaca	ccaagacccc	agggcccaag
32281	cttctcccat	tgtgcagctc	cacctctgcc	cccggggcct	agctgaggcc	tcctccaagc
32341	tgagccacct	actatcttcc	aaactcccac	cctccatctg	gtgtcacctc	ctcccagaag
32401	ccctctgtat	cagtttctct	ttttctgcca	taaaaaaaat	cactccaagt	ttagtggctt
32461	aacatgacac	aagtttacca	ttttacagtt	taaaaggcta	gaagtccacc	atggccctcc
32521	Ytgaagctaa	atcaagctgt	cagcagaacc	agattccttc	tgggggctat	aggggagaa
32581	taattccctc	gctttctgca	gcttctagag	gcttccccca	ttccttggct	tcctctccat
32641	tacttttatt	tagggcgagg	gaagcttctc	gctctgactt	tctcatttat	ggtattctcc
32701	cctgctttcc	agcagctgtg	attgtcccaa	gtcctgtcct	ctggttctct	aggccagaaa
32761	aactatgatc	taccagagct	caagaacttg	aaagggcctt	ttcccactgt	cccttctcac
32821	agtgaagagc	ggagcccagc	ttcgtgctag	aatctgtgaa	aatggagaaa	tgcacctgtg
32881	gctgttctct	tcctccaccc	ggcactctcc	ctgcagcccg	gctgggtttt	tttgttggtt
32941	tgtttgtggg	tttttttgtt	tttttgtttg	tttttgagac	agagttttgc	acttgtcgcc
33001	caggctggag	tgcaatggca	cgatctcgac	tcactgcaac	ttctgcctcc	tgggttcaag
33061	cgattctcct	gcctcaacct	cccgagcagc	tggaaccaca	agcatatgcc	accactcccg
33121	gctaattctt	tttttttttt	tttatgcatt	tttagtagag	atgggggttc	accatgtggg
33181	ccaggctggt	ctcgaactcc	tgacctcaga	tgatccacct	gcctcggcct	tccaaagtgc
33241	tgggattata	ggcgtgagcc	acggcctggc	ccagtctgac	tgttttcact	tactctctaa
33301	tgctcaggt	agtgtttatt	gtattctgtg	cggaggtcaa	gaatttagtc	atccaagag
33361	gttagtgtat	taggagctta	cgcagctatt	accagaagag	actccactca	aaaatttggg
33421	acgtggctgg	gcgcagtgcc	tcaaacctat	aatcccagca	ctttggggag	ccgaggcggg
33481	cagatcacct	gaggtcagga	gttcaagacc	agcctggcca	acatggtgaa	accctatctc
33541	tattaaaagt	acaaaattag	ctgggcatga	tggtgcatgc	ccataatctc	agctacttgg
33601	gaggccaagg	caggagaatc	actgaaccca	ggaggtggag	actgcagtga	gctgagattg
33661	cccgctgcac	tccagcctgg	gcagcaagag	caaaaattctg	tcacacaaac	aaacaaacaa
33721	acaaaaaaaa	cgggttgggc	atggtggctc	atgcctgtaa	ccccaaact	ttgggaggct
33781	gaggtggggg	aatcacctga	ggctaggagt	tcaagaccag	cctggcaaca	tggtgaaacc
33841	ccctctctac	taaaagtaca	aaaattagct	ggatgtcgtg	gcgggagcct	gtaatttcag
33901	ctactaggga	ggctgaggca	ggagaatcac	ttgaacccag	gaggcagagg	ttgcagttag
33961	ccgagatcgt	gccactgcac	tccagcctga	gcaacagagc	cagactcagt	ctcaaaaaaa
34021	aaaaaaaaaa	caatggtagt	agctttaaat	ttctgtagaa	ctgaaagagg	attggagatt
34081	gtagtagggg	ctaattctaa	attagagcat	ttagaataat	gtggagtctg	gtcaacatag
34141	tgagaccccc	ccaattctga	caaaaaagac	aaaaattagc	caggcaggtg	tgggtgcatg
34201	ctgtgggtccc	agctattcca	gaggctgagg	caggaagatc	gttgggaattc	gaggctgcag
34261	tgaactgtga	ttacacaaat	gcactctggc	ctgggcaaca	gagagccacc	ctatctcaaa
34321	caagaaagaa	caaaactaaa	aaaaaaaaaag	aagaagaaga	atttggagca	atctagttgt
34381	ttcctatacc	agaagtcttt	gccaatctat	ttttttttta	ttttattttt	aatttttggg
34441	agtacatagt	aggagtatat	atttatgggg	tacatgagag	tacatagtag	gagtatatat
34501	ttatggggta	catgagatgt	tttgatatag	acctgcaacg	ttttgtcaat	ctattttttt
34561	tttggcgaca	gtcttgcctc	gttgcccagg	ctggagtgtg	atggcgcgat	ctcagctcac
34621	tgcaacttcc	gcctcgtggg	ttcaggctat	tctcctgcct	tagcctccaa	actagctggg
34681	actacagacg	cccaccatca	tgcccgggta	atttttttgt	atttttgggg	agacgagatt
34741	tcaccatggt	ggccaggctg	gtcatgaact	cctgacctca	ggtgatctgc	cctcctcggc
34801	ctcccaaagt	gctaggatta	cagggtgtgag	ccaccacgct	ggcccaccaa	cctatttttg
34861	atctaacttt	acctctgggt	gtgtattgat	actcttccga	atcaattttc	acctctcttc
34921	atataccatt	tacattttcta	agaattttgtc	cattttcattt	catctagtta	acctcatttg
34981	ttgacatata	attgttcgta	gtattctctc	ataattcctt	ttatttctgt	aagactggta
35041	ataatggcct	tgctttttatt	tctgttttta	gtaatttgag	tcttcttctt	tttttttttt
35101	tttgccagtc	tagctaaaagg	tttggtgatt	ttgttgatct	tttggaaaaa	ccagctattg

35161	ttttcaccga	ttgttggttt	tgttctatta	tttcattcat	aggcactaag	atcctgatta
35221	cttccttcct	tctgctagct	ttgggcttag	tttgccctta	tttttcaagt	tccataagggt
35281	ggaaagtttg	attattgagt	tgagatcttt	ctctttttta	aagataggca	tttctagata
35341	taaatctccc	tgtgagcacg	gttccctcca	tcttcagcac	accagggttg	actctctccg
35401	ggcggttctc	cctgggtcacc	tctcccttcc	ctctcctctt	ctgcctcctc	tccacttttt
35461	cggtaccctg	tgattgtatt	gggaccaccc	agataaccta	ggatcatctc	cccacctacc
35521	ccaaggctct	taacttaacc	atactttcat	atgggtaaca	cgagttgagt	gtggtaccca
35581	gggtttgaca	tggtgggtaa	catatttgca	ggttctgtgg	attaggagga	cattttgggg
35641	gccatgattc	tatcttccac	cctcgcttag	acaaaattgg	aggctcactc	cttgggctcc
35701	ctggatgacc	ccaacatcc	ttctcactt	ccattccttc	ccagcatcca	gatcagccac
35761	ttgtccatcg	ccagcagcca	ggtggagctg	gtggaagcca	agtccattga	tgtctccatt
35821	cagaacgtgt	ctgtggtctt	caaggggacc	ctgaagtatg	gctacaccac	tgcttgggtg
35881	taagcatttc	tgtcagctga	tgccccatgc	cctggccctc	tctgggctgg	agggtcgaat
35941	gagggctcctg	ggctcctggc	tctttccagg	ctgggtattg	atcagtccat	tgacttcgag
36001	atcgactctg	ccattgacct	ccagatcaac	acacagctga	gtatgtgtca	agcgtcctct
36061	ggggaagtgg	gagctggact	ccagggtctg	gcctcagcag	agggggagggt	tgtgcaggca
36121	gaggggtctg	gggccaccaa	aggaggccca	gcctgggaag	tttgcagggtK	tggggacccc
36181	agagctggcc	aagctcttga	ctggcctggg	cagcatgtgg	ataccatctg	atagcggagg
36241	ctgccctgag	gtcatgtcgg	gtctccctgc	agcctgtgac	tctggtagag	tgcgagccga
36301	tgcccctgac	tgctacctgt	ctttccataa	gctgctcctg	catctccaag	gggagcgaga
36361	gtaagtacac	caccctgtgg	ccccattcc	tgctcgtgcc	catcctgtta	gtgtgtccac
36421	ggctccYtcc	aggctcaacc	ccacacaggg	catgcttgtg	ggtggccaaa	cctgagggca
36481	gcaatacctt	cagtggggtc	acttcttacc	ccctcccatc	aatacacccct	caaaggctgg
36541	aaacaacaat	aaccaacagc	tagtaactaa	cagctattaa	gaacttgctg	tgtgcaaagg
36601	actattccaa	gcccttttca	tgaattaatt	gattttgtcc	ttaaaaccaa	ccctaggata
36661	tagattctgt	tatcatcccc	tttttacata	tgggtaaaact	gagtccacaga	gaggttagaa
36721	aggaaaagct	catatctacg	gagtgcatcc	tgcattecaa	gcaccacact	aactcagaga
36781	taaaactcta	gccaaagctaa	gtaacttgtc	gaggacacac	aactcggcac	taagggtagg
36841	gagtaggatt	tgaacccagc	attctctgac	cccagaagct	gagttcctag	atactttact
36901	ctcctgcttc	ccagggtggg	gctttttgtc	ttggccaaca	ccctctgtca	aggagctgtg
36961	ggtaacccca	ttgcacagag	gaagataaca	aggtttgagg	agtccctagt	catgttacca
37021	atgccaaacc	tggaaaggcag	aagggaaactg	gtgggtgggg	tctggagagg	agccctctat
37081	tcaggccatt	ttctgactct	ggagcagacg	gatacatgta	tgaatttgga	ctctagacac
37141	gttctcgtgt	gtgtgacagg	tgtgagcgtc	acaggagctg	ggccctcccc	aggaattctg
37201	ggatgggtgc	acagttaatt	cttgggtctg	aggctccgtg	ttctcagctg	caaaatggga
37261	gtgataattc	ttacttctctg	agctacaaga	gtcagggcca	acagagccat	gaacgggtgc
37321	tgttacacac	taggcRctcc	atggatgcac	aggactggtc	aggggctcat	tgtgtgtctt
37381	gctgccttca	ggcctgggtg	gatcaagcag	ctgttcacaa	atttcatctc	cttcaccctg
37441	aagctgttca	tgaagggaca	ggtgagttag	gctgctgac	tccctgtggt	ccagggccat
37501	gcccaggagg	ctggatccct	ttcttccctg	cctttccctg	agaagggtgcc	actcccacct
37561	tctccatgtg	gccagtcctc	tgtgccggtc	cccagcactg	ccaccaccac	gcagctggaa
37621	ggaggcactg	cctctggcct	cctttctctg	ctggaaagca	cctgctctgt	ctgcccacga
37681	tctgcaaaga	gatcaacgtc	atctctaaca	tcatggcYga	ttttgtccag	acaagggtctg
37741	gtgagtYgt	ttctgtctgc	atgcctcaga	agacagcagt	gggagccaga	aagccacctg
37801	ctgcactatg	tggccttggg	actgtcactc	ttcctgtcta	ggtcccatgg	gctctatctg
37861	gctctgacac	ttgatgatta	ggttatggca	tactttggca	aatctctgcc	cctttgggct
37921	gcagcMtcac	aagctgtgtg	cgtgtgggca	agtctataga	actcaggaca	aatgggtgat
37981	taagtccaag	aggactccaa	gattctcctg	gaagtagatt	aggaaaaaag	ataattagat
38041	tgtcacatg	gctgggcact	catccatgta	ctgtactctc	ctatgcagta	cagagcagag
38101	ctgggtttca	gcccaagtct	tggactctgc	tctgaaccaa	ccttctagaa	gggctctacc
38161	taccagaca	gacagacttg	ggaaaagaga	gaatgaaaaa	gtgccacacc	cctccccgca
38221	caccaggtc	ccactttaca	gaggggaaca	ctgaggctgg	aggggtgggt	agctgtgtgg
38281	atgcagggga	gcgtgactc	agggcaattc	ccccatctg	agggcctgctg	ttgatctttt
38341	cctcctgcag	ccagcatcct	tctcagatgga	gacattgggg	tggacatttc	cctgcagggt
38401	gatcccgta	tcacagcctc	ctacctggag	tcccatcaca	aggtaggagt	tgtgggaggg
38461	tggggcaggg	cccagcttcc	ccaggggagt	tgttcctttt	ttgtgctctg	acaacccctg
38521	ccccagctt	caaccttatg	gcagccaaga	gtcctggggg	gctcctcctc	attcctgatg
38581	ctcctccgca	ttcctgatgc	tgcgaggagg	gcaggccaca	gcgacgtgcc	cctgacccct
38641	ctctgcaggc	accagggtctg	cccactacaa	ggatccacgc	aaagcaccag	ctccttccta
38701	gagggcttat	tgggtctctg	tcatcctcta	cagcagtgga	ttgtggcccc	cYcccagggg
38761	gtactgacaa	aagctttgga	ccctctatta	cttaggatat	agatttctgt	aacaaagaaa

38821	tccgaaataa	tagctgctta	aacacaataa	acagttat	ccctctgttg	cgttctgagc
38881	atctgcagcc	ccgcggggtc	aggaggctgc	aggggtgtcag	gcacgcaggc	cccttccacg
38941	tgttctcagc	cagccccagg	catgacctca	tcccagggtc	ctggctgact	ggcctgacca
39001	ccacacccac	tctgctcaca	gcccgttggc	ctgaacYtga	tcgcaggacc	ccaccctagc
39061	tgcaaggga	actgaggaat	ttatttcagc	taaattattga	gaccagctaa	aagttaagtg
39121	gtacagaatg	gagggagaga	ttggagaaga	ctttagggtc	gacccagcca	tctttgtaac
39181	agagcctctc	cctggaaaac	tggacagaag	gatcatttca	gaggttcatg	gccactcctg
39241	aagcctgttc	acaacccatg	ggctggatga	tctagtgggg	cgggggactg	ggcagcagct
39301	tgttttcctg	atthttggcct	ccaggagccg	atgggtcaatg	gactgccctc	tgccaggggca
39361	gggctgggtg	tcagctgggg	cgggggtggga	gctggagggtc	cgtgggtcacc	agctgccctg
39421	actaatgtcg	ttacttgaat	ataacccctgt	gaaggcaggga	accacgtctg	tctggttcac
39481	ttcccacggt	ggttgagaca	tagtggggcac	tccggaagta	ttgttgtaat	gagtgaagag
39541	cccgctgggg	gaaactgggt	acagctcttt	cctcagtttc	cccatctgca	ctctgggtcg
39601	aatgctgggg	ctctctccaa	tctccctgaa	gctggacctg	agcccagtag	ggacacacag
39661	ggtccagcca	gcgtcctggc	ttcctccagg	gtcatttcat	ctacaagaat	gtctcagagg
39721	acctccccct	ccccaccttc	tcgcccacac	tgctggggga	ctcccgcag	ctgtacttct
39781	ggtttctctga	gcgagtcttY	cactgcctgg	ccaaggtagc	tttccaggat	ggccgcctca
39841	tgctcagcct	gatgggagac	gagttcaagg	tgagtgggtg	gggctgggct	gctagggRat
39901	ccagatggca	tggtgtatgt	gtgtgtgtgc	acacgcagtg	ggaggaggga	ggaaactcgg
39961	aaacttggtg	gtgggcaaaa	gaactaagct	ggagcaatag	cagtgaagtc	cagactgggc
40021	acagtggtgc	acacctgtaa	tcccaatcct	ttgggaggct	gagatgtagc	aggacgaacc
40081	gcagacaaaa	ctcctcagac	actgagttaa	agaaggaaag	agtttattca	gccgggagca
40141	tgggtaagac	tcctgtctca	agagcggagc	tctccgagtg	agcaattcct	gtccctttta
40201	agggctcaca	actctaaggg	ggtctgcatg	agagggtcgt	gatctattga	gcaagttagc
40261	ggtacgtgac	tgggggctgc	atgcaccggt	aatcagaacg	aaacagaaca	ggacagggat
40321	ttttacaatg	ctctttcatg	caatgtctgg	aatctataga	taacataact	ggttaggtca
40381	ggggtccatc	tttaactacc	aggcttaggt	caggtaggcc	caggcctggt	ttcgggtctg
40441	gttccttggt	ttcgggtctg	gtctctaggc	gttgggtac	ctgcctttag	tttcgcttct
40501	ctttcttttt	ctgagtataa	aacaatataa	aacaatatga	gagggtctgt	ctctcttctc
40561	tcagagacag	gaggttccct	ggaggccagg	agttcaagac	cagcctgggc	aacatgggga
40621	gacccctgtc	tctacaaaaa	taaaaaaag	tttaaaaatc	agctgtgcac	ggcRgtgcac
40681	acctatagtc	ccaactactc	aggtggctga	ggaggaggga	tcacttgagc	ccaagaggtt
40741	gaggtgcag	tgagctatga	tggcaccact	gcactccagt	gtgggtgaca	gagtaggact
40801	ccatctcaag	aaaaaaatac	agtccagcat	ttattggagt	caactatgtg	tgccagata
40861	gatagatgga	tagatagaca	gagtgtcaa	tagatttagg	tatagatata	acttggcacg
40921	tagtaactgt	gcattaaata	taagttgata	ttagacttac	atttattgca	gttatatttg
40981	ctacactttg	ttttgttgca	ctcatcctgt	gaaataagta	ctgttacctc	tgttttgcaa
41041	acaaaaaaac	cacaaagctc	agagaaggta	ggtgacttac	tgaagatcac	acagcctgta
41101	agaggtggcc	ccaaagcctg	tactcttcac	ctatactgta	ctagaaatgc	ttaggtagtt
41161	tccaggctgt	gcttgtcatt	gaactcatga	ggaaactgag	gcccacagag	gggaagagac
41221	ttgtgctgag	tcacacagca	tggtgtgggc	acagtgggga	gcagaagcca	ggcctccagc
41281	cgggacaggg	gttccctgtt	ccacaccctg	cccagagcat	ctcacatgtt	gtctgggagg
41341	ttgggagttg	cgtctgagga	ggggtccagt	ccttgaaaact	gcccttggtc	cctgcgaagt
41401	tttcttctga	ggagtggact	ttactccacc	caccctccaa	cttccctcatt	tcttttcagg
41461	cagtgctgga	gacctggggc	ttcaaacacca	accaggaaat	cttccaagag	gtaactgccc
41521	cctgcccctg	tgtgggggtt	atctcacgta	ccccaatcct	gctctggctt	caagagcccc
41581	cacacagcca	ataacaccac	caatggcaac	aattataaca	gcgaacacag	ctcctactcg
41641	gttggttcggc	atggagtga	gcacttagtg	tgtgtgactt	ccttcagtg	tcacaccgac
41701	cctatgagt	gggctgcaa	actgtcccca	ttttacacac	agggaaactt	agtgaatggc
41761	aaggctgggt	ttgagcccag	ctctattgcc	cccaaagata	aggctccatt	ccctgctcca
41821	tttcccaggc	atagRgactt	gtagggggct	ggaaccccag	gatcaactct	gggctcagag
41881	ggccccagca	ataagtgact	gttgattact	cctgatccca	aagctgactt	caggcaagct
41941	ccttgagggt	cgagccccct	tcttgctatg	cccagtgcca	atgatgttca	taatcccact
42001	cctcagtgca	gggttccact	aagaacccat	gatctcctac	ctcaaatgga	cctcatgctt
42061	tctgagtaag	cctccctcag	ctttctggtc	acctcactcc	ccccaccac	tgcaatgact
42121	tcttcaggcc	ttccctgcca	tcctcaaate	tcagctgcc	ccctcctgtc	taccttccac
42181	ttccctctcc	acacacaacc	tgcttacccg	agagctgagc	agagccacca	acagaacttc
42241	ccccccacgt	cgctgctccc	agtcgcaacc	cactcaccca	cacctgcgcc	ttcctgcggc
42301	cgttctcctg	ttctaacaga	ggacRgtccc	tcttcccttc	tgaactcagg	ccgtccagcc
42361	ttccccggct	ctgtgatgYc	tctctccYtg	cacatacaca	actcacaata	ttgggcaggc
42421	ccctgacccg	cYcttctccc	ttageccctt	gtctgagtc	tgttcctttg	atgtccctatt

P A T E N T
Docket SEQ-4095-PV

42481	tctagctctt	ccatttctct	ctgtctctac	ctcctcccca	ggctaccatt	atctctagt
42541	gggacccatc	tgtagctccc	gggtgggtctc	cctgtgtcct	gataccctcc	aataatctgt
42601	tccccacagc	agccagaaca	atcttttcaa	gaaataaaac	tggtcattca	cctgcctgct
42661	taaagccggt	gtaggataca	ggctaaacgc	tctcccatgg	cctccagggc	cctgcatttt
42721	ctcatcctgt	ctacttcttc	atctagtgtg	ttcccaccca	gcgtaattgt	aactgtttag
42781	ttgaaagtgt	acgaggtctt	ttgtcagctc	tagaaatttc	ttttcttttc	tttctttttt
42841	ttttttttaa	gacagagtct	tgctctgtgg	cccaggtctg	agtgcagtag	cacaatctca
42901	actcactgca	acctccacct	tccgggttca	agcaattctc	ctgcctcagt	gctgaaatta
42961	caggtgtgag	ccacagcacc	cagcccatca	gctctggaaa	tttcttcac	actctctctt
43021	ccatgattgc	cccattcccta	ttttctccat	gcctacctcc	tggaaattcc	atgagacaca
43081	cgttgggcca	tctcattcca	ttttcgtgt	ctcttagttg	ctctgtcgtg	tttccatct
43141	cttttatctc	tatcctaaat	tctggatagt	ttcttcaagt	atctttttag	ttcattaatt
43201	ctttttacag	ctgtgtctta	ttgttttact	taccactga	gattttcatt	ttattttatt
43261	taattaatta	attttattat	ttttgagaca	gagtctcgt	cttgttcccc	aggctggagt
43321	gcagtggcgc	aatctcagct	cactgcaacc	tacgcctcct	gtgttcaagc	aattctcgtg
43381	cctcagcttc	ccgattggct	gggttcacag	gggtgcacca	ctgtgccag	ctcatttttt
43441	tgtattttta	gtagagacgg	ggtttcacca	tggtggccag	gctgggtctg	acctcctgac
43501	ctcaaatgat	cctcctgcct	cagcctccca	aagtgccggg	attacaggtg	tgagctcccg
43561	caccccgccg	gccctttctt	tcttttgagc	tgagctatgt	atttaatgaa	accttttctt
43621	gtgtatccag	cRgttcagtg	gtttcttggg	gcattgtgatc	tccttgagcc	cagtccacca
43681	ggctgtaatc	gaaggtcctc	aggccacact	ccccagcccc	gctggctgcc	tgccatttcc
43741	ttatcttggc	catgttccct	ccacagggct	cttgtccaca	ctgtccctcc	tgccagaatg
43801	gtttgccctc	ccccatgcca	tctgtctctc	ctcctgccac	ctcagggaa	gcctctccca
43861	cctccctgac	taggtcagtg	ccctcgtgc	cacagcctRg	tgtgtctctc	ctttaaatat
43921	tcctcagctg	cagttttacg	ttctgttctg	ggatgccctg	gaaaatgctg	ggctcctgca
43981	gatatggccc	gcagctcctg	cgctctctgc	tctatcccca	cccctagccc	agctgctaca
44041	gcagcttccc	tcggaggggt	accatgcagt	aggctcctgt	ctaagctctt	tcacagatt
44101	atctcattcc	atcctcagga	caaccctatg	aggtaggatc	tatgattatc	ccatttttac
44161	agatgaggaa	agtgaggccc	agaaggctaa	gtgaaggcat	cctcagcaca	tcctgagaga
44221	ggagtccagg	gtaggaatag	cttcactagc	acacagatga	gaaactgagg	ccYagagagg
44281	acaagagtcc	taatttgcac	agcctggggc	ctgggcacta	ccccagcta	cttcttttcc
44341	cccagccctg	gggcccggag	ccagctttgt	ccttcccatc	tccgagggca	tggaactgct
44401	ctgccctgat	gggcccctgt	cctggccatg	ggaccctgt	cttccacagg	ttgtcggcRg
44461	cttccccagc	caggcccaa	tcaccgtcca	ctgcctcaag	atgcccaa	tctctgccca
44521	aaacaaggga	gtcgtggtca	attcttcagt	gatggtgaaa	ttcctcttcc	cacgcccaga
44581	ccagcaaat	tctgtagctt	acacatttga	agaggtgagg	cgggtgcagg	gagaggtggt
44641	gggtggggaa	cctgactcac	atatggggccg	cagagggcag	gggcctgggg	gtctctgaag
44701	cctccagatc	cttctcacca	cctctgctgg	cactgggtgt	ctcttgaca	tggtctctta
44761	caatcacaat	cacatctgc	aagtaacgag	gggttacaca	cgtgggttcc	acagcttagg
44821	taatatcttc	tctcttttct	tatttttatt	tttttttagag	acagggctctc	actctgtcat
44881	ccaggtcgga	gtgcagcctc	acactcatag	ctcactgcag	cctcgaatcc	tggtgctcag
44941	tgatcctccc	acctcagccc	tcctgagtag	ctgggaccac	agacaaacac	caccacacct
45001	ggctaattta	aaaaaaaaaa	tttccttaga	ggcgggggtc	tggtatgttg	tccaggctgt
45061	tctcaaaactc	ctggcctcaa	gcaattctcc	tgccctggcc	tcctaagtgt	ctggggttat
45121	aggcatgagc	caccatgcca	agcatatgtt	ctttcattct	tatttttatt	tattatttat
45181	ttattttactt	attttatttt	ttgacacaga	gtctcactgt	gttgcccagg	ctggagtgcg
45241	gtggcacaat	ctcggctcac	tacaacctct	gcctcccagg	ttccagcgat	tctcatgcct
45301	cagcctccca	ggtagctggg	attacaggca	tgcgctacca	cgcctgacta	attttttgta
45361	tttttagtag	agacaggggt	tcgctatgtg	ggcccagctg	gtctgagact	cctggtttca
45421	agtgatctgc	ccgcctcagc	ctcccaaagt	gctgggatta	caggcatgag	ccaccagcc
45481	cagccaatat	tctcctcctt	aagctgagca	gtggacaatg	gtgtttatta	cccaggtcca
45541	caacccttta	ttcattaggg	ccacaagggt	ttccaaatcc	agaacttctg	tgaatttgta
45601	aaagttagtat	agtgtataga	cactggatat	attgcagaac	accccaatag	gggtggtggg
45661	ggcaccaccac	aatcaattct	cctcaaatgc	ctcaattggc	atttctcctc	atatgaagca
45721	agataaatac	catacatagc	ttcctagaca	atggccagggt	tttgccaaca	aaacttaaga
45781	aaaaacttgt	agttttcaga	tcctgtttga	ttttataatt	acaaataagg	aattaagaat
45841	cagtatttatc	tttaagtctc	cttagaatat	cttcaatttt	tttttttgag	acagagtctc
45901	actctgtcac	ccaggctgga	gtgcagtgggt	gcaatctcgg	ctcactgcaa	cctccacctt
45961	cctggttcaa	gcgattcgcg	tgccctcagcc	tccccagtag	ctagctggca	ctacaggcgc
46021	gtgccaccac	gcccagctaa	tttttagtag	aggcgggggt	tcaccagggt	ggccaggcca
46081	gtttcaaagt	cctgacctcc	agtgatccac	ctgcctcagc	ctccaaaagt	gctgggatta

```

46141 caggcatgag ccactgtgct cggccaatat ttcttaatac attaagaact aaagacaaga
46201 gcgatacaat cacattgtgg aaaatataga aaaatagaaa gaagaaaacc actgtcacca
46261 taacccccctt ctccaggggc cttcgaatgtg gtgactgggt gcatttcctt ctgggtgcttt
46321 gttatttttta aataaatttt ttatcttgga gtaactttat atttgaataa aagttgcaa
46381 atacagagtg ttcccatata tccccacccc acttcccgtt ttgtccacat cttacataac
46441 catgctacag tgtcatagcg gagagattaa cattgggtgca tgactgttaa ccaaactcta
46501 aacttttattt gaatctcccc agttttttcca ctgatgatac cctttttctt ttccaagatc
46561 tgatccagga tagcacattg tattttagccg ttcttttttg ttgttgtttg tttgtttgtt
46621 tgtctgtttg tttctgccc aagctggagtg cagcgggtgat cctcccacct cagcttctcg
46681 actagagatg tgcactacca cgtatttttt ttgtagagaca ggggttttgcc acattgcccc
46741 agctgggtctc aaatccctgg gctcaagtga tcctcccacc ttggcctccc aaagtgttgg
46801 gattataggc atgagccact gtgccaggtt tatttagcct tttaaatata tctttaattt
46861 tgttattact ttctttttca tttttctggt ttattccttt ttgctttctc atgtggatgt
46921 agacatatata ttttattttac ttattttttt gttgttaaga atctgaaaca ttgagcattt
46981 gttaaaaaaa agaattattc ggccggggcac ggtgggtcac gcctgtaatc ccagcacttt
47041 gagaggctga ggtgggtgga tcacatgggtc aggagttaa gaccagcctg gccaatatga
47101 tgaaccccca tctctactaa aaatacaaaa attagccgga catggtggca catgctgta
47161 gtcttagcta cttgggaggg tgaggtagga caatcgcttg aacctgggac gtggaggttg
47221 cagtgaagctg agatcgtgcc actgccctcc agcctgggca acagagttag actgtctcaa
47281 aaacaaaaaa agaaaaagaaa agaaaaagaaa agtgacttct caggtcctaa ccccaaagcc
47341 acagggtgctg gggaaactttc ctcggttttc agaagagcag tagctaagcc tggttcccgt
47401 gtcatccttg cctctccagt ccctcagtg gaaagaatcag gggccctgag ctaggagggg
47461 tgcctctctgc ttccgggaaga gccctggctc acagcaaatt tggtttctct ccccaggata
47521 tcgtgactac cgtccagScc tctatttcta agaaaaagct cttcttaagc ctcttggatt
47581 tccagtatgt gctgcagaga agagaggggg cggtaactc cgcaaacctc tccctggccc
47641 ctggagtgca ggcacagggc ggggtgttgg tggggaaatg tggccctttt cYtctggggc
47701 atatgggctg actgcagggg gataagacc ttgcctagata gaatcttctg ggggaagaag
47761 gggctccagc aagaatggag ggctggcagg aagaagggcc tggcaggagg agagcgtgc
47821 ccgagcaaa ggcctggccgc cagaatagca aatctcaagg gaatagcaaa tctcaagaga
47881 gtgccccaaa gggcctgagc tatgagacag aagcactggc tgctattctt agagtttctt
47941 tcccagggga tgttacagga gggggcccaa tggagggtca aattatcatc gcttttttat
48001 ttcaggatta caccaaagac tgtttccaac ttgactgagg taggtagtct tggatagact
48061 gggggaaata agtcctgtgg gacctctgct cttaaagaaa gcaggcggag ggcctaaag
48121 gaaatcaggc aaccagacca aaagaatgtg gaccaggtgg tccatgtctg gtctcttgtg
48181 acccttcttc tccctgccat gtcttttggg agagcccttg tgttgcaaaa atgagagtgt
48241 ggtggtatgg attgggggtt aggcagaaca gtactggcca agcagcgctt ccctggacct
48301 caattttccc tctgtggaat gggctagcaa tcctgggcct ccccagggcg aaggaaagac
48361 cactcaggaa gggcacgctc tggggcagga aaacggagtg ggttggatgt atttttttca
48421 cggatgggca tgaggatgaa tgcctgtcca ggcctgagc catctgcctt gtgggtcact
48481 tctgtgctcc agggaggact caccatgggc atttgattgg cagagcagct cggagtcctt
48541 ccagagcttc ctgcagtcaa tgatcacgcg tgtgggcac cctgaggtca tgtctcgtaa
48601 gtgtgggctg gaggggaaac tgggtgccga ggctgacaga gcttccattt tcacctgtgt
48661 ggccttcccc aggcagagct tcaggtgccc ctcttcccag tcattgatac tttagcgttc
48721 tggccccctt tcctctccct gctgggtgYa ttgcacgcca atgactcggc cagatgcccc
48781 gacctctgtt cttggtttac ctgcagaata ttatctttgc caccctcgcg gatggctcaa
48841 cccactttca ggaatgcagg ttccctaatag caacctgata tagcagaaa accctgggc
48901 tgggagtctg agacctagtt ctagcccagc cctgaacctc agtttccctt tctgtgaaac
48961 aagaatgttg aacttgatga ttcccaattt tccttttgac cttgaaatgg tagaatattt
49021 atccctttga ggtgactcgg atggtagact ctcagacacc atagcacacg tgtgtctggg
49081 gtatttttga ccaggctctg ctgagagctt tctgctccct tcccacaga gtatgttgag
49141 ctgactgtgc tttccttttg aacatctgct tgtccacatg gcttaggtag gagaggaagg
49201 gcgtggaaac tggaatgatc ctagtggggt gtcttggcat ctcttggcct cattttcccc
49261 atctgaacca tgaagctaaa actaggggat gtggattaaa tggttcctac aactacttgc
49321 aaggagacca ctctgtgtgg ttgcaaaaga cactttgaga agctgtgtgg gaaagtttcc
49381 ttcttagcag ggtagactca gctaactgca ggtcatgtgg ccatgttgga tgggttggga
49441 gctcaagttt ggggcagaag ggaatttttt ttggcagcag agtggaagc cctgccgcca
49501 ggcaaacctc gctcttctc atcctcagaa gcacttgctc actctgctaa atcaaaagtga
49561 aacgcagtgt tacagaatat tgggtccaaa ggggtctcagc atctcccact acccaggggtg
49621 gcagagcctc gggccggcct tgctcccaa gaagggtgga ctggggctct gtcccctgcc
49681 ccagggctcg aggtagtgtt tacagccctc atgaacagca aaggcgtgag cctcttcgac
49741 atcatcaacc ctgagattat cactcgagat gtgagtacaa agccccctc accagcccc

```

49801	gttcctgggg	agagaggccc	agacaggatt	cctgggggtga	ctgggggctg	ttggggagac
49861	agacagaggg	gcctctacca	gcttgggtcc	ctcctgggtg	cctgggagtc	agcccagctc
49921	Rccccctct	cctaactgccc	ctcccctcag	ggcttcctgc	tgctgcagat	ggactttggc
49981	ttccctgagc	acctgctggg	ggatttcctc	cagagcttga	gctagaagtc	tccaaggagg
50041	tcgggatggg	gcttgtagca	gaaggcaagc	accaggctca	cagctggaac	cctggtgtct
50101	cctccagcRt	gggtgaagtt	gggttaggag	tacggagatg	gagattggct	cccaactcct
50161	ccctatccta	aaggcccaact	ggcattaaag	tgctgtatcc	aagagctgSg	gagtccttct
50221	tctgtggctg	gcgggtagag	ggRgggggaa	gggattgtct	caccagtgc	gtccacctct
50281	tttcagccct	tccaaggcag	ctgcccccaa	accctccaag	cttcagtatg	actggaggaa
50341	gaaatccaaa	cttctctcct	tgggactcac	gatcctccct	gatcagggtc	ctggatacct
50401	tccaaattta	tcccccttaa	cccagcactc	tccttgtctg	accagcttcc	tgcaggagct
50461	gtcacacact	ctctgtccct	tgggggtcca	gtgctggaca	gaaagtgagg	gaggaccagg
50521	gcttcagatc	ctgaggatgg	tgggagggga	agggggccctc	agaggtctgg	tttctggtag
50581	aaatggagga	agacagagcc	tttaaaaagg	caaacgactt	tattccagaa	gataaactgc
50641	tcacgagcct	gagcttattt	ccagctcacc	tttttttttt	tttttttttt	tgagacggag
50701	tctctctgtg	accaggtctg	gcatacctg	gcacaatccc	agctcactgc	aacctccact
50761	tcccagggtt	aagcaattct	ctgcctcag	cctctcaagt	atttaggatt	acaggcacc
50821	gccaccacac	ctagctagtt	tttgtatttt	tagtagagac	ggggtttcac	catgttggcc
50881	aggctggctc	cgaactcctg	acctgcagtg	atccacctgc	ctcaaccccc	caaagtgtct
50941	atgttaaata	tggtgaaccc	caagtttttc	ttcaaagaat	cagtatgtct	gtatgttcag
51001	ctctcttatt	ctttgattct	ccattttaaa	gtttaacttc	ctggttctct	tcgccccctt
51061	gcttctaatt	tcagtaaaca	accttttcca	tcagttttat	tcagtagttc	acacctgttc
51121	ccctggtcac	ttgtcccatc	ctgactcatc	ccagtcacct	gctttgacct	gagtcacccc
51181	tggtcacctg	ctctgatgta	agtcaccttt	agttacccgt	tcctaactgt	ccttccctgc
51241	aaactactca	cctcgccact	ctggctcata	cctctgctct	ctttaaaata	gccaatcgga
51301	attagcttag	accgtgcggg	ccaaccttag	ccaacagggg	aacaacatag	cagcagggat
51361	tacctgggtc	aggaataaga	accccttccc	ctcccttggt	caactgtgct	ctcaccattg
51421	ttccatctat	gaggagcacc	ctttctacag	aaactaaaaa	ttgtttgctg	agaaaattaa
51481	atttatgttt	gagtgtctatt	tctttgcagc	agtggagaa	aagcattcct	aacactggga
51541	ttgcaggcat	aagccaccgt	gccagcttc	cagctcacct	tcttatgtct	aaattgtgtc
51601	ttctccttcc	cacctccaag	ctacaataca	aaaagtttct	tccaaccctc	tcagtcttgg
51661	aaggtagcag	gctctatttt	ctctgggtgt	gtaaagaaaa	tgctctctcc	acattagcca
51721	attgagacgg	gaggaaagcg	agcaagatgc	tggctagtgc	aaggtccctg	gggtagaag
51781	aatcatgatg	gattcaagaa	cagtcaagag	ggctgggtgtg	gcctgaaag	caaagaacta
51841	ggggcgagag	atgaggccca	accagcaggc	agggtcacat	aacaaagggtg	ataaaaaggc
51901	ttggccttta	tttcagcagc	caggagagac	agccaggagg	ctggggctgt	ggggagctca
51961	gaagtaagat	gccccctcca	gtctgggaat	atgtgagggg	agggcaccat	cttctgagcc
52021	aggttctctc	ccagcccttc	cctgcccttc	caagtgcctt	ctgaggcctg	tttctcttcc
52081	tcccttgggg	cctaagcaaa	gtgtctgact	cactaagcag	gagcatcatg	ggcggtatgg
52141	gcggctctta	aagggccctg	gcagaaggag	tcagtgtgat	ctcgccagtc	cctgagtcca
52201	acgtgggaat	tctgggtctt	gggatattgg	cctttgaggt	ggtgacacca	gttaggagcc
52261	acatcccacc	caagaatgtc	cccttgaaga	ggctgggaag	gccaaggcc	cccaccttga
52321	tgctacaatg	acagaatcag	gataacttgg	cagccctaag	gcagctcttc	cttgaatgga
52381	aacttttatc	tgcatgaggg	gcagacagag	aagtcacttg	gagtcttaac	ccttgtagac
52441	cccagcctga	ctgggactcc	agaaggtccc	agggtctctg	tccagaaaga	agggtagggg
52501	catgccccca	gcttccttca	gtgaccttgg	agaggtctcc	ccagggtctga	gctgggaggg
52561	acttccatgt	cactgtctca	tccaaggagt	gcgattagca	ggagatatgg	agtccagagg
52621	gtgagaggct	tacaaaaatg	ggactgacct	cYgagccct	ctcccaaatt	ccagcccttc
52681	catccaagcc	tagaagctct	gacctagtcc	tattgaagtc	ctcctggcct	gggtgtgtgt
52741	tggggggaat	cctggctcca	acccagttag	gatcatttcc	ataaagaagg	ccacacctgc
52801	tgcttctctc	ggggaaaaac	aagtgtctcc	caaggccagc	accaggcaga	agcacatcct
52861	gccacctggg	ctgctgacct	tgggcaggat	ggggcccggg	tgtttggcaa	ataggaaggg
52921	tgaggggaag	gcctggcttt	cagacctggg	tctaattcca	gctcccccca	acccagttta
52981	ctaattctgc	catcctgggg	ccccctctgtg	cctccatttc	ctcttctatt	caatgggatg
53041	ataatacttt	ccatgtagga	ttctggcaag	ggctgggtta	gcccagagga	ggagcccatg
53101	gtggccaaga	gcaggggctg	cagagctggc	ctgcctgggt	ccaccttctc	gctcctctgc
53161	ttctgtgtga	tcttgcccaa	attatttagc	ctctctgtgc	ctcccttttc	tcactgttaa
53221	aaagaaagat	aacagttgcc	atgaagagta	aaggagaggc	cgggcatggt	ggctcagacc
53281	tgtaatcca	gcactttggg	aggctgaggc	aggggtatct	caggagtcca	agaccagcct
53341	ggccaactag	gtgaccccc	ccatctctac	taaaaataca	aaaaaattag	ctgaatatgg
53401	tgggtgtacac	ctgtagtccc	agctactctg	gaggctgtgg	caggagaact	gcttgaacct

53461	gggaagtgga	gggtgcagtg	agctgatatt	gtgccactgc	actgcagcct	gggcgacaga
53521	gtgagactgt	cttaaaaaaca	aacaaacaaa	aagattaaag	gagagagcgg	ctgcattttg
53581	ggaggccaag	gcgggctgat	tccttgagct	caggagtgtg	agaccagcct	gggcaacatg
53641	gtgaaaccgg	gtctctacta	aatatgtttt	ttaaaaaaa	ttagctgggc	atgcacctgt
53701	agtcccagct	actcgggagg	ctgaggcagg	agaattgctt	gaaccggaga	gggtggaggtt
53761	gcagtgcagct	gagatcatgc	caatgcactc	cagcgtgggt	gacagagcaa	gactccatct
53821	caaaaaaaag	gagagagcac	agtgtctggt	atatcctaag	tgctccacga	gtgccagaca
53881	ttggttatata	ttcatggagg	tgaggtaacac	agaggtgtct	aggtcatgcg	gactcactcc
53941	atcctccagt	taaccatgac	tccctcccca	cccacctcct	gagttctctc	tgctgtcaaa
54001	cttctctctc	atatctccag	tttcccaccc	aaaagtccaa	acactcaaga	ttccttctca
54061	tctccaaccc	ataaaatctg	atcggcttct	ccacactcaa	gtgtaaata	ctgatggcca
54121	tttgattgac	actggagggg	ctggcacatt	tttagcacat	tttagccaa	aggtatgatg
54181	tgctgatagc	ggactctcag	gccacaagcc	agtctgagga	cagggaaggt	tgaggaggtt
54241	cactcttcca	gaaccctttg	gtgataacct	ttctggcagg	cctggtaccc	ccagagtga
54301	aaagggtcca	gggtcaagac	ccagctctgc	ccctcattgc	tggtgaccc	tcagcaactc
54361	acttgattta	tctggacctc	agcttcttca	tctgtcta	gggataata	tctttgtcct
54421	gcctctcca	cagggtctgt	cagaattaaa	tgcatctgaa	aatgatctgc	attgtgtct
54481	tggaactgtg	ttatttgttc	aagtgtctgt	ctaccctgcc	tgacagggga	gcgggtcagg
54541	gtcttccctg	ggacttcatg	cacaggtcct	tcctgggact	tcagttagga	ccagccatcc
54601	cgctcagtgc	cagtgaacat	gagctgtctc	cctgtgggat	gtctgggagg	tgagtggaa
54661	gccttctctag	caggcacata	ctggaacata	atcaatccct	cccatgcata	cagctcacac
54721	ccacattctt	atccattccc	accatgcccc	tcagtggcct	ggggagacta	ggaatacccc
54781	acttgacaga	taaggaagct	gaggccaggg	gaggtcaagg	catttgtctg	aggttgaca
54841	accaggagtg	gtgaaagctg	gagtcacaca	caaggaatca	ctgcaaagtc	tggtccttc
54901	ccactctgag	taggacttga	accagggatg	tccgatgctg	atgcttgtgt	cctgaccact
54961	accttgacgc	gtcctcacc	acacccaccc	caggcctggg	aggcagggga	gcaccagcgg
55021	tctgggagtg	aaagtgtgtt	ccctgtggga	tgtctgggag	gtgggtagaa	ggccttccta
55081	gcaggcacag	gtgccaccg	gatgagtatg	tccaggggga	gaggagcccc	ctgtcccagg
55141	atgtgggcaa	aaacctggag	aagctgaagc	tggaacttga	ggatggcccc	tgacYccatc
55201	ctgggacagc	cacctcccct	tccttctgcc	ccctccagtc	cctcctctcc	ttccctgctc
55261	tcctctctac	ctctttccat	ctcccctttt	ctgctgtgta	ttcctcctgt	gactggggca
55321	agatccttca	cctctgtcct	ccctgagcct	cagtggctca	cctggaacat	aggggtgatg
55381	ctgcagaagt	attttagggg	tactttatga	gataaattgg	tagactgttt	ttcccgggtc
55441	agccagccag	gggttcggtg	aataggagcg	aacgctgctg	ccattccctt	ctcccctagt
55501	tcactcctga	ggctctccgc	tcctcccctg	gttctaagtc	ccctcctcct	gcaccgtatc
55561	ccccctccca	tccaacccag	tccccactga	ggcactgaga	cagggtcttg	gcccagggtc
55621	ccaacccacc	tgagctccgc	atgtgagccg	accttcaccc	gcctgcctca	gtttcccgtc
55681	cacgaaaggg	gtgagcgccc	ccacgtctcc	tgggactgtc	cttgggtccg	atgcccgggt
55741	gtggggagtg	gccagggtgt	ggcgagcaga	gggagcgggt	gtgttaggcc	cccgccatc
55801	ccgcgcccga	gccccatctg	gtcgggctg	gcacctcgaa	tccacgtgat	ttctcggcag
55861	cagccgcccag	ttccatgcac	tgccggagca	gctctaggcg	gcggcttcta	ctttcagttt
55921	cgtcagagc	gcggaggagc	cgcgagcgct	gagggtagt	gccgggagct	ctgagggtag
55981	gtgccggggc	tgccgcgggg	ctgcccggac	cgggctgggg	cgagcggaag	ggagaggatc
56041	gggggttcgaa	ttctgcacgg	agaggggtgg	aggggatgtc	agaggccctg	gagcgggagg
56101	tgccgggtggc	cgggtggctg	gccgatggat	agctgggtaa	gcggacaggg	cgccagtggc
56161	ccggcagcgc	gcacagcatg	cgccccggca	gtttggagga	agagttgccg	gcccgcagag
56221	gatggcagat	gagggtcgcc	tggaatgggg	gacacagtaa	gcggctgtgc	tcccctccct
56281	gcgcagctcc	tgtcacctac	cggatccacc	cactctctct	gtcttttact	ttgcaacttt
56341	tcattgattt	taaaacaatt	acggaagtta	cactgttcat	tgtaYgcaat	ttagactttt
56401	tgccctaaac	aactttttat	tgtggaaaat	tccaaacata	tacaatagta	gaaggaatag
56461	aattaggttg	agccttctgc	acctgcgggt	tttcatata	tgaagcccca	cctatccacg
56521	ttcagcttgg	acagtacaga	ccccaaggcc	acctaactac	gaccccaagg	ccacctaggt
56581	agcccaatct	ccaccgtgg	ttattttgaa	acaaatggca	gacagcatag	catctaaact
56641	gaggtatttc	agaatgtact	aaaagataag	gcatctttta	aaaaaaaaac	cacagtacca
56701	ccagcatact	acaaacattt	taatagttaa	tccttaatgt	caaactctca	gattatttct
56761	aaggaacatt	taacctcata	agtgataggt	gaatacgtgg	gtgttgtttt	gttacttgct
56821	ttctgcattc	ccatgtgggt	ttcggtcact	attctcacc	agaaagccag	gacctgaac
56881	tggtctgggt	gatcattcga	ggaggtcgga	agaggtcct	accttcagt	ccgtttgcgt
56941	ccattttata	agttggagtt	cttatgtttc	cttttttaaa	aggttgaagt	ttctgcagac
57001	ctaaaaagca	gtttgaaaac	tggcagttcc	cagcctctaa	aaccggggg	tagcaggagg
57061	cagagagtac	ccgggggcca	gatccgtggag	cctcattgtc	ccttcaaaYc	accttccgtt

P A T E N T
Docket SEQ-4095-PV

57121	tctctaagg	agaaataaac	cttgaaaagc	catgggcttt	tcagatgtat	ctagatgtat
57181	ctgatgcttt	tcaggtgtat	ctagactccc	atccagcgtg	ctttctgcaa	aacttactga
57241	accatagccc	agaatggcca	tccatgatgc	ccaccgcct	tgtctcctga	agcacattgc
57301	caggtggacc	tgcacatggt	gtggacggca	gacagactgg	ggctctcaac	aactgggtatt
57361	tgctggatga	ccatgaacta	accattcaat	ttctcgaaac	tttggtttct	cgctctgaaa
57421	atgaacatat	gcaaatctat	cctacaaagt	gtgttttgtg	gattgaatga	gatgatacac
57481	gcccacccag	tgcttgatc	aaccttaaaa	tgctgcacaa	gtgtgagggg	agatggatcc
57541	ttgaagaaga	cagacaagca	gaggggaaag	atcttggaag	agtttcacaa	tatgtgaaac
57601	tttattcctg	gatcagaYac	agagctgtcc	gggtgtccac	agggccgggt	cagcctcttc
57661	agaccccaac	acacataccc	tcttcccctc	tgaggaaaat	tcagcaaaac	ttcttttgtc
57721	gttggtgttc	tttattcctt	tttttttttt	tttttttttt	gacgaagtct	cactctgttg
57781	ctcaggctgg	agtgtagtgg	cacgatcttg	gctcactgca	acctccatct	cctgggttca
57841	agcgatttct	ctgcctcagc	ctcccagta	gctgggatta	taggcgccc	ccgtacacc
57901	cagctaattt	ttgtattttt	agtagagatg	gggttttact	atgttcgcca	ggctggtgtc
57961	aaactcccaa	cctcagatga	tccaccgcct	tcggcctcct	gtgggattat	aggcgtgagc
58021	catcttgccc	ggactccttt	tttttttttt	tttttttttt	aatagacatg	aggtctcaaa
58081	ctcctggcct	caagtgtatca	gtctgcctct	gcctcccaa	gtgttgagat	tatggcggtg
58141	agccaccaca	cccagccata	acttcttagc	atgacttttc	ccatttggtt	tgagtccaat
58201	tgtgcctccc	cacaaaagat	atgctgaagg	cctaaccctc	ggcgccctct	aacgtgacct
58261	tatttggaag	tagggctggt	gcagataata	ctggtgaaga	tgaggtcata	ctggagttag
58321	atgggccttg	aatccaatag	gaccggtgtc	cttataagag	aggagatgga	cacatgaaga
58381	cagagacata	cggggatcag	acaatcatgg	acggaggagg	aagagagtgc	ggcgatgcac
58441	ctaggagcca	caggacacct	agaatggcca	gcagccggtg	ggaaccagga	gaggcaagga
58501	cggatcctct	cctccagcct	tcagagggag	cccggccctg	accacacctc	gatctcagac
58561	tctgacctcc	agaactgcca	gagaagaaat	ctcagttggt	ttaatgtacg	cagcttgtgg
58621	cactttgtga	cagcagatac	agcagtactg	tgacaacact	aggaacgaa	tacaccatcc
58681	cagcatctct	gctctgtttt	ccatacagaa	ttgaactaag	gaccaggcaa	gctaattgaa
58741	Rtccaaacac	tgtaaaaaact	ttggaggcaa	tctaaggatg	tgagccagat	ttgtttgcca
58801	gatctttttt	attttattta	tttatatttt	ttatattttt	tttttttttt	agtgagaggg
58861	agtctcactc	tgttgccctag	gctggagtgc	agtgtatgta	tctcggtcca	cagcaacctc
58921	cacctcccag	gttttaagtga	ttctcctgcc	tcagcttcct	gagttagctgg	gattataggc
58981	acctgcccc	atgccagct	agtttttgtg	tttttagtac	agacaggatt	tcaccatgtt
59041	ggccaggctg	gtcttgaact	cctgacctca	ggtgatccac	ctgccttggc	ctcccaaaat
59101	gctaggatta	caggcatgag	ccaccaacac	ccagcccata	tattcatatt	tttaattggc
59161	ttatagatga	aaatgggtatc	tcacttttaa	aaataaatga	tatggaatta	tgcggttaag
59221	gRaaattaaa	tcttattata	tcattgtttt	aaatttttaa	tttttcatag	ctaatacatt
59281	tatgtagttt	taaaaaatgta	aaacatttgg	aaagatatata	tgaaaaataa	gtctccttcc
59341	atctcctgtc	tcccagccac	ccaattgccc	tccccgaaga	caaccaatgt	tatcaggttc
59401	ttgtgtctcc	ttccaaagac	agcttaagtg	tgtttttaca	aacatggata	tatacatata
59461	tatatacacg	tatatatgtg	tatatatata	tacacacaca	cacacacaca	catatacaca
59521	tatatagaca	cacacacaca	tgtgtacttt	tcccttctca	caaatggcag	tgtactatat
59581	gtagtgttct	ctaacttggg	tttttttttt	ttaaacttag	tgcaatttgg	aaatctttct
59641	acatcaaaat	tttaaaatct	gccctttccc	tctttctttt	taacagctgc	ctagtatttc
59701	accgtatgac	tgctctgtaa	ttgatctaac	agttgtagaa	cacttagggt	atttctgtgc
59761	ttttgctatt	tcaacagtgc	tgtaatgaat	atccttggtc	aggcatcatt	tttcatacgt
59821	gggagtgaat	ctttaagaaa	accgagtggt	gatttgcaag	gtcaagggga	atatgcagtt
59881	tgaacttggg	taaataaggc	aaattatccc	cccttaaagt	ttgtactaat	ttttgctccc
59941	accagctgga	gggggagggg	ccaaatttcc	atatttgcaa	atctgggaga	cgaacaatgg
60001	tgtgtttttt	atgcctctta	ttacgaatga	gtttgaacat	cttttcaaat	atttaagagt
60061	cacctgtagc	tcattttcca	taaaactgtca	gttcatatcc	tttgccact	tttttatagg
60121	cttttggctc	ttttcctgtt	gagttgtaaa	agcacttttc	atgttaaggg	aatttgctct
60181	ttgtctatta	tatggttata	ctgtcattta	aaatgggtgc	atagtgtgct	atagaatgtc
60241	tgaacctatat	gcgtcattgt	tagatattta	tattgggtct	cattttcttg	tattatatat
60301	gggatgtttt	ccctgttttt	tgtaaaaaaa	aaaaaaaaag	caagatatga	cattttaatt
60361	cttccaatag	ttctcaccat	aatgggtgaag	gaaaaggaaat	acgtttggga	aaatacttcg
60421	ataggatttg	gggtggctgg	aacctgtgtg	caaaatggcc	aacaggggacc	aggaccattt
60481	tgggtgggaa	gagagtgcct	tgcatggtgt	atgtgtatgg	ggcgaggggg	ctgtatttgc
60541	tcctgaaaga	aaaggggggtg	gagggagggg	agaagaaagg	aaggagagaa	gggtggaggga
60601	ggtttagccac	agagggagat	gactcccaga	aacttcttag	gggaaggatg	gcaaaagggc
60661	attttcggtg	agtcaggaa	tgccctctgc	tccgtgtgag	gcaggtacca	gcactgcaga
60721	caccggctct	ggctcaccac	ctgcccattc	gagtgcatcc	agcttctcca	Ytgagcttcc

60781	acacaccagg	ccttgcctcta	ggcactgggc	tacagccggg	aacacaacca	actccctgcc
60841	ttgtggagct	gatgaggcag	tagaaacaga	caaacaagta	aacaaagatg	tgcattgtcat
60901	atgagggtcag	gtggaagtga	ctgcagtgaa	gaaggcaagg	caggcgaggg	tggagcatgc
60961	tRgatagaga	ggcagatgta	gccttcttgt	agggatgttg	ggacatttga	gagagaactt
61021	gaagggagcg	tggcagggaa	ccatgggcca	tggcatcttg	aggaagaggg	aaccagtacg
61081	aggggatggc	aagaaacaaa	aaagtgggga	gaagaagaaa	gcagagaaga	ggagaggagg
61141	gagaagagga	gaaaatgctg	cttaaagtct	gcttttgtgc	tcccagatgc	tcatttgtgaa
61201	tgacattttt	gcaatttttg	caatttttgt	ttgtaattta	ataatgggct	gggctgggag
61261	cagtggctca	cgctgtgaat	tccagcactt	tgggaggctg	agatgggcag	atcacttgag
61321	gtctgcagtt	tgagaccagc	ctggccaaca	tggagaagcc	ccgtctctcc	taaaaataca
61381	aaaatagcca	gggtgtgggtg	cacgtgactg	taatctcagc	tactctggag	gctgaggcag
61441	gagaatcgct	tgaacctgag	agggtggagg	tgtagtga	tgagatcggt	ccatgctctc
61501	gcgctgtgct	tacagaggga	gactcggtct	caaaaaaagc	aacaaactgc	ttgaattaaa
61561	gcaggagccc	tcagctagag	gagtggccac	ccacctctct	cccagggaatc	gcagagctcc
61621	caggagaggg	catagcctcc	tataggtcat	ggcattgcag	gtgggttggg	gtcccagctg
61681	gctgtttctg	tctcaagaaa	ggaagggtct	ctcccgtga	catccaggcg	taagcaacgc
61741	cctgggtgaa	atcctcgtag	ctagagcttt	gctcacattc	tggatggctt	ccttaggctc
61801	aatcctcaaa	gtggactcct	aaagggatat	atgaactttt	attttttaaa	tgtttgaaac
61861	cggtgtgtca	aatttctctc	ctaaaagatt	gtgccaatgt	agagagggtg	ccgaccgctg
61921	gaagcttccc	aatccccag	cacctatccc	ttgtgggtgg	gatggatcct	gtaccatcgc
61981	cagacctca	agaacctctt	gtcctgcaYg	gtcccttctg	tccctcctgg	tgaaatggaa
62041	ggagcatgca	tgcttgggga	agctgtgtct	ttgaggcatt	cagatcttac	cggtggcatca
62101	tgtttgaaga	gagaaatagc	ttgtgttttt	gtgtgtctct	caatagtctt	attcactgag
62161	ttcttgaagg	tgctctgtgt	gtttctggac	tgcaaatcc	ttttattgaa	atggacagg
62221	cagtgttttc	ccagagaaag	acctatccag	taggagttca	caagaggatt	ttaggaggta
62281	tgtggagagg	gcacccgatt	ccattgaatc	gtaaaagtac	aaatttgttc	ccttttcagt
62341	tctttttcat	tcttccagac	tagtgaaaga	gaaagcctca	gtcaggtgct	aacgcactcg
62401	taaaactctc	acactcttga	tattttcagc	aaggggaggc	caggcctccg	gtcagagccc
62461	tgggtctgca	gcaataccce	gctacagttc	aacagcatca	tagtgttttt	tgttttccct
62521	ggctttcttt	cttttctttt	ttttctagac	aaggtctcac	tctgtcaccc	aggctggagt
62581	gcactgggtg	cacagctccg	tgcatagttt	cctgcagcct	ctatttccca	ggctcaatcg
62641	atcctcctgc	ctcagcctcc	caagtagatg	ggactacagg	tgcgcaccac	cacacctggc
62701	taattgtttt	ttgtttttat	ttttgataga	gacgagggtc	cattacgttg	cccaggctga
62761	tctcaaaact	ctgagctcaa	gcagttttcc	tgctttagcc	tcccaaagtg	ctgggattac
62821	aggtgtgagc	ctccatgccc	cacctttgag	tttcttttcg	atgatacctt	cagttctgtg
62881	caagtgttac	ttcaaaaaat	aaagttaaaa	gtgacatggt	ttctagaaaa	gcttttaagg
62941	aatggtgttc	tggctttcag	ataagtcaaa	aaaaatctca	aacatgagta	aagagttttg
63001	gaaattatac	acttaccctt	agagggtgag	tttgtggggg	aaatttcata	atgtatactt
63061	ccagaatatt	tagaactttc	caaatagtag	caggttatgt	tcgtaaacag	gaaaaataat
63121	aaagacataa	taaaatgata	atttagtttt	aaaagacgac	cattttgttg	aagcagtatt
63181	atatttcagt	taggaaatgg	cctctggaat	cagcatagat	tttattgttt	tatttatttt
63241	gtttttgaga	cagtgtctca	ctctgttgcc	cacactggag	tgcatagtag	tgatcacagc
63301	ccactgcagc	ctcaacttcc	tgggctcagg	tgatccttct	gcctcagcct	cccaaatagc
63361	tgggactata	ggtgcacacc	actatgccag	gctaattttt	ttgcattttt	tgtaaagaca
63421	gattttcacc	atgttgccct	ggctgtgtct	gaacttccag	gttcaagcaa	tctgcctgtc
63481	tcggcctccc	aaagtgttgg	aattacaggt	gtgagccact	gtgcccggcc	agcatagatt
63541	ttaaatccac	cttttgttgc	ttgacttctt	ggagcctgtt	tcttcattct	tgaaatgcag
63601	gaaacgtgcc	tggaaatatt	gcttgagatt	ctaattggga	ggtgcagggt	gaatactgta
63661	gcctgatgcc	cagcctatgc	cggaactca	gtacataaca	gccaatgagc	attggctgag
63721	gactggacat	gtcccctcct	tgtgctgtag	tattaatgtc	tccaaccttc	acagtgatcc
63781	tgtgaagtaa	atgtaaaatc	accacccaga	tgaggaaaac	agtggcacag	agaggttaag
63841	aaaactgtcc	aaggttgccac	agcactaaaa	tgttgaaatc	aggattttaa	cccagccctc
63901	ctgaccccag	aggatctttt	ttcaaaaatt	atgttctttt	attttatttc	gagatggggg
63961	tctttccagc	tcaccagggc	tggagtgcag	tcacaatatc	acggcttact	gcgcctcaac
64021	ctcccaggct	caagtgatcc	tcccacctct	gtcccccaac	ccccagttgc	ttaggagcac
64081	aggcacacga	caccatgcct	ggctaatttt	tgtacttttt	gtagagatgg	ggtttctcca
64141	tgttgcccag	gctgtgtctc	aactactggg	ctcaagcgat	cctcctgctt	cagcctccca
64201	aagtactggg	atcacagggt	tgagccacta	tggccagcat	tagaggctct	tttaacagct
64261	ccacaattcc	ctgtgagatg	ggctgcatac	aaagcattac	tcctgcttga	catatacaca
64321	aacatgggcc	caaaagggagc	tgggacttgt	ccggatgtca	gcctctaagt	cagttttggg
64381	tcagtggagc	ccaaaaccaa	ggctctagcc	gtctagcccc	tccaaccttt	cttctgcccc

64441	agttttatgg	gtttggcaat	gtctgccagg	atgggagggg	gcagttcaga	tgatccagtc
64501	tggaggcaaa	attctgctaa	attcaaaagg	cccagcctca	agtcactgat	gtcttttttt
64561	tttttttttt	actttaaaaa	aatgtattMa	ttctaaacca	cacaagtaag	acacgaatca
64621	gtcttccttg	cagaaaagta	aactttttat	acataaagct	gatattctatt	ttactcactg
64681	cttcacagccc	catgcctgtc	ccctctccctg	cagtaacccc	tatttgatat	gtttccagaa
64741	ctttatctaa	accttcacat	aataaaaaata	attctttatat	agggcttact	aacttccaag
64801	cactgcttta	agagcttttac	atattttaagc	cccacaataa	ctctgtgagg	taggtgtctg
64861	tcttatcccc	attttacaga	tgagaacatt	gaggcccaga	gaggctatgt	aactggcctg
64921	gcgtcaccca	gcctgcagtt	ggtggaaagg	tcagtcccaa	atctaggcag	ccttgctccg
64981	aaattcatgc	tcttagcctc	taagttataa	aacatgctat	tatcgacctg	tgggaagaaa
65041	cagtattgct	gtttgttgat	gtgtattttg	agacaagtga	tatcatgttg	tgcatatcat
65101	tatacaatgt	gtcttgttta	ttccatgata	catcttgaag	atacagccac	gtcaacaaaa
65161	aataagtccc	tttctgttac	ataatcccac	agcgtgggta	caccaaaactt	tattatggct
65221	gtctagggtg	tttaaagacc	gctgctggaa	tttctttatc	caagactctg	tgtgtcttag
65281	cccattgggg	ctgctgtaac	aaagtgcag	agactggctg	gattctaaac	aatagaaatt
65341	tattttctcac	agttctggag	actaaagtct	gagatcagag	tgccagcatg	gtcgggttct
65401	ggcaagagcc	cttttccggg	ttgccgatgg	cggacttttc	attgtatcct	cacatggtgc
65461	aaagcaggct	agagcattct	cttgggtctc	ttttataagg	gcatcaatcc	cattcactac
65521	ggctcctccc	tcctgacctc	attacctccc	ccagacccca	gctcctaata	ccctcctatt
65581	aggggttaga	gtttcaacat	gtgaatttca	ggggagcaca	aataatcagt	cgatcacatt
65641	gtgtattctg	ggcccccaagg	ctgtccattt	tgctttctgc	tgagaagttt	agtggtaagg
65701	tcaaagggta	gaagcgagct	aagatctaga	agtcaactgt	gatttgcctt	acaagatggg
65761	caaaccactt	cccagcctgc	agctctgagc	cctggatcca	ggccttctct	cctttatgtc
65821	tcgagcttac	tctgtcccct	gccttactta	ccaaaccaa	gcaagactcc	tctgggacat
65881	tcttgccagg	ccccatggca	aggttggagc	tgaggagggg	acttccaaac	cttggtttta
65941	ttttcacttt	ggcttgggtg	tgccaagccc	tggcagagcc	acagagttgg	ggcacagggg
66001	gccaagaaac	agctcccagc	ctgaggaagg	tgctctgccc	tgggaagggg	ataRagctga
66061	gtgttggtta	tggggagaca	tcctcaaggt	ctccatctaa	atatggtcaa	cttgggtggc
66121	ttcctgtccc	cagggccttt	ggRgctctca	gaggacaaga	atcactcagc	tctgatttgc
66181	tggagaagca	gagccccagg	tgggaggtag	cgaggagcct	gtctctcccc	actgggagtg
66241	gagagctggg	tgccacagcc	tcaaacagtt	gttcccagac	atcggcacat	ggggaacccc
66301	ccgggagctt	ccaaaagtgc	cagtgccctg	gttctacctc	ctgggatggt	gctgtgatgg
66361	gtctggagtg	tggcccattg	ggatttttta	aagacctctt	tcccagggtga	tgccgtctgt
66421	cagacaagca	tgggaaccac	tggcctggaa	gccccaggga	gaggcctctg	gggcccggga
66481	cacgcaagcg	ggagccttct	cctagcagcc	ttgctagcca	cccacccctt	cctgtgggtg
66541	ctagacccaa	actgccaggg	ctgagcagga	gaagcaaggc	caccagctgg	ccactgctg
66601	tcccagccag	gctcaggctg	gcagtagggc	accccagtc	tggaggaggg	tgcatctgga
66661	aagcttgggg	gctcttggtg	gaaagttcaa	gccttttagc	taggaaggtg	gctgggtgta
66721	aggaggcagt	ttaaagacta	gtgatgtggg	ctgggacca	gattgctggg	tttccaatga
66781	ccagaagaag	atggccttgt	tggactgggg	acagggaaca	cccaggctca	ggcctgaggg
66841	tgggagtgca	ggcatgaatt	tgagtgcagg	ctcaggaaca	tcccaggggc	cgccaggcag
66901	ggagacacct	cttcaactcc	tggctcctcg	actctagctg	gtgacctagg	caggtccctt
66961	tcccactgtg	agcctcaatt	tcctcatgtg	taaagcatca	tgactgtgtg	ttttaagtcc
67021	tttagggccc	tatctttgtg	agggacaaca	gagacgatgg	ttttcacagg	caacagtcac
67081	ccttgcatca	tcactgactc	acagaaatgg	atatgcccta	taaggacatc	tcttgcttgc
67141	cctggccagca	tttgtgggcg	ggggaggaaa	tggccactaa	ccattcctga	aggcacctcc
67201	caaggggacc	ctgaaaaggag	ggtgacgcct	cccagaaaaga	gaccagtggc	ccagcccagc
67261	cctgctctta	gtttgttttc	ctctgctttg	aatgccagca	aggcctttcc	ctcccagggg
67321	ctcagtttcc	ccatctttac	aatgggcaca	gcatagacct	catcactggg	gctctttctg
67381	ctctgccacc	ctgtgcatcc	aggctcaggt	gttatccgaa	gccctgacat	catcagccat
67441	tcccgggggg	aaggcagagg	cgctgggttc	tctgtgtccc	cctggtaggg	cttgggttag
67501	gattcaggga	ggattggagg	gcctctgtgg	cctcaggtcc	tccccagggg	tccccaggcc
67561	ctgacctgtc	cacctggacc	taaagaacca	acaacagcag	cactttctgt	ttcttttagg
67621	tatttctgtc	caaattgtctg	tagtcatgac	tggggtgcct	ggctatcacc	ccacaaactg
67681	catcctttct	gatctgcaca	gatgagaaaa	ctgaggtctt	gtttcccttc	catcccaaga
67741	cctaattggga	cctcctcctt	aatctaatacc	tcaagaggca	gaaacaggat	ggaaagcaaa
67801	ggaatggcag	ccagaagtct	gYggctccac	tcctgtcttc	tctgcatccc	tcacttcctt
67861	ccttacacca	ggcgtcaggg	cgtggagaga	cggaagaagc	gatagcaacg	acaaccacac
67921	tagtggtaat	catagcttgt	gtggattgaa	cctttttttt	atttttctatt	tttaattttt
67981	gtgggtacat	agtaggtgta	tatatttatg	ggttacatga	gatgttttga	tataggcgct
68041	cagtgtgtaa	tcacatcagg	gtaaatgggg	tttccatcac	ctcaagcatt	tatcctttgt

```

68101 gttgcaaaca attcaattat actttttgtt attttttaaat gtacagttaa attattactg
68161 actatagtta ccctcttggt ctattgaata ctaggtttta ttcattctaa ctattttttg
68221 taccactaa ccatccccac ctccccacc ctggcctcct actatacttc ccatcctctg
68281 gtaaccatcc ttctactctc tatctccatg acttaaattg ttttgatttt tagatcccac
68341 aaataagtga gaacaagtga tgtgtgtctt tctgtacctg gcttatttca cttaacataa
68401 tggcctccag tgccatccat gtcccttgcaa atgatgggat ctcatctctt ttgatggctg
68461 aatagtactc cattttgtat gtgtgccaca ttttctttta ctcttttatt cttttctttc
68521 tttcgagatg gactcttgct ctgtcaccga ggctggagtg cagtggcacg atcttggtct
68581 actgcaacct ctgcttccca ggttcaagca attctcctgc ctgagcctcc caagtagctg
68641 ggattacagg catgccccac catgccctgt taatttttgt acttttagta gaggaggggt
68701 tttgccatgt tagccagggt ggtctccaat gcctgacctc aggtgatcca cctgcctcag
68761 cctcccacag tgctggaatt acaggcgtga gctgccgtgc ccagStgcca cattttctct
68821 gttcattcat ctgtcgatga acacttagat taattccaaa tcttggtctat tgtaaacata
68881 gctgtcataa acatagtagt gcagatatct ctttgagaca ctgattcctt tcttttgggt
68941 atatacctag cagtgggatt gctggatcat atggtagctc taaatttagt ttagtttttt
69001 tttgtttttt tttttttttt gagacagagt ctcaactctgt ctcaaggctg gagtgcagtg
69061 cgtgatctca gttcactgca acctctgcct cctgggttca agcgattctc ctgctccagc
69121 ctcccaagta gctgggacta caggcatggg gcgccactac gccagctaa tttttgtatt
69181 tttagtagag acagggtttc accatgttggt cgaggatggt ctcaatctct tgacctcatg
69241 atctgcccac ctggcctcc caaagtgtgt ggattatagg tgtgagcctc cgtgcccagc
69301 cctattttta gttttttgag gtacctccga actgtcctgt agtggctgta ctaatttaca
69361 ttcccaccag tgtatgaggt ctcccttttc tccacataga ttgagggtt tgtttgtttg
69421 tttgttttgt tgtttggagg tgaagtctcg ctctgtcgcc cagactggag tgcagtggcg
69481 tgatctcagc tcaactgccg ctccgtctct tgggttcaag ctattctccc acctcagcct
69541 gggattacag gcgcctgcca ccacgcctgg ctaatttttt ttattttaag tagagacgag
69601 gtttctcat gttgccagg ctgctctcaa actccggacc tcaggtgatc tgcctgcctc
69661 agccttccaa agtgcctgga ttacaggctt gagccaccat gccagcctg gattgagttt
69721 gtatcatgtg ccaggttcca tgtcagggat tccacatgcc ccatcccaca acctcttgc
69781 cagggtggga ttatgatgac cccccatagc agacactgtc agagctcccc caaccccatc
69841 tctgcccgga tgcccccaact cactgtgggt gacacctgca tcttctctcc ggggtcgctt
69901 ttgcctgggt ggcattgcct tgctcagaga tgctgggca gtcatgcctc cctccccgcg
69961 ccactggggg tgcaagtgcg tgaagtgtga ccgaccaccc agacccttg cacatgcgca
70021 ggatggacct cttctatcat cacgtccag ttctcccatg tggcaggctg aagcRaggct
70081 tttgaaacca tatctttgct cagctgcctc tgctacccta tcttctctcc accacccctt
70141 caataaacia ctccacagg aaccccctt ggctctgctt ctagggaact gacctagaag
70201 atcctcattt tacagatgag gacgtgagg tacgaagagg ctgcgtaacc taccagggtc
70261 acacagcttt ggtgtggagt agggactcaa atccagggcc ctggtacgga ggcatttgcc
70321 ctaccaaaga ttacaggcat gagagaagcY gacgggccta gagaatggca agacttgaga
70381 gatcagaagg aaggagagag ggtgagaat ggatccccgt gctgaggtct ggtctggaag
70441 gagaagtctg caaggtagga aaaagaggaa aggggacgtg aggtagggaa gcaggatgtg
70501 caaggcgggg acttgtgaaa gagaatggcg gggggtgggt agcagcatct catgggcagc
70561 tcagcagggt caggagaggg ctaggagggc cggggactgg atgatgaaag ggcatttgtt
70621 tatttatcct ttgtttttgt tttttgttgt ttaaattgag accagctctc acaatgttgc
70681 ccaggctcgt ctgcgcaact gtctgccac tctggcctc aaacgatctt cctgcctcag
70741 cctccaaaag tgttgggatt acaggcataa gccaatgttt attcgtcctg agccttccct
70801 ggacacctga tatgtagctg ctttgggtgt gtcacagttc catggtgtga ctttatcctg
70861 gaggcagttg gatgctgata gcaagttcag acaggcatga ggccagacca gactgtagt
70921 ttcaagataa ctccagccag aggtatgctg gcatgtgcac atgtgggtac atgtatgtgt
70981 gtgcacgtgc atgtgtgtat gactgtggac tagagatgga atggctttct gagcaaaagg
71041 aacagccaag gcaaaggcct gtgggctgca gggagagaac aaggtttgat ctctgcactc
71101 cctctcttaa gctctgtgtc aacagcattt tcaggacagc aggaaggatt cccaaagagc
71161 acagcagcga gggcagttgg agggaggcgt ctgctgggac actgaaacca gggYggggta
71221 aactccccct gcacctcctc agactcagag ccccatataa tcttccaggt gcacccagc
71281 ccttttccct ctctctgtct gaactgggtt ggcatgatcc caggactgca actccagctg
71341 tctggattcc ccttactgac tgcgtgaccc tggccatttt cctccacct ttctctcagc
71401 gccccatttt gattactcgg cctcaggggt gcaactggga ttcttagagg taacacttcg
71461 aacggaaagc cagaggtcct ggtgccaaaa tgcaaatgtg agggcttgaa agttcactcg
71521 gttttatttt ctctgttccg tttgcagtag ctcttctttc ttgttttcta tagaacagta
71581 aaaaaacttta tgcatttgaa tatcgtgaac cttgtaattc atatgcaata taaaaactac
71641 tagctatgca tggagaaatc aattgaagaa cagtggctta gcatgtcttt ctcatctttt
71701 gatggctacc tcaaatcaaa tcaatatgaa cttggggtca ggcattgggtg ctcacacctg

```

71761	taatcccaac	acttggggag	gccaaaggcag	gaggatcact	tgagcgcagg	aatttgagac
71821	tagcttgggc	aacatagcgg	gacctcatct	taatattaaa	aaaaaaaaaa	agagaaaagaa
71881	aaaagtgaa	cttgggaggt	ttgaatgaca	actcgtatag	ctgaagtaat	agatatattc
71941	aactttttaa	acttaatttt	cattagataa	cacatgcata	tggtataaca	ttctaggcca
72001	ggtgcagtg	ctcacatctg	taatcccagc	actttgggag	gccaaagggtg	gcagattgct
72061	tgagcccagg	agttgaagtc	tagcttgggc	aagatggcaa	aaccccatct	ctgcaaaaaa
72121	cacaaaaaat	tagctagggtg	tggtggtgtg	cacttgtagt	cccagctact	caggaagctg
72181	aggtcgggga	atcatataag	cccaggaggt	ggagactgca	gtgagccacg	accacaccac
72241	tgactccag	cctgggtgac	agagcaatac	cctgtctcaa	aaaaaaaaag	aaaaaaaaatt
72301	cctttcactg	gggacaatta	cctttatgaa	tttcttccag	aaatattaat	gtatttgtat
72361	acacattttt	ttttgagaca	gggtctcact	ctgtcaccca	ggctggagtg	cagggatgca
72421	atcttggctc	actgcagcct	ggataccccc	aggctcaagc	aatcctccca	cctcaacctt
72481	gcgggtgact	tggaacaacat	gtgtgcacca	ccactcctgg	ctaatttttg	tattttttgt
72541	caagatgggg	ttttgccatg	ttaccagggc	tcgtctcaaa	ctcctgacct	caagtgatct
72601	gccgcgcttt	gcccctcaaa	gtgctgggat	tacaggcatg	agccaccata	tttatttttt
72661	ctttacacaa	aggaagcata	ttctacaccc	tgttttgccc	cggctctctt	ttaaaaaaca
72721	gtgtatcttg	gataaccattc	catatcatte	cataaagttc	atcttcatcc	tctttttttt
72781	tttttttttt	tttttgagac	agggtttcac	tctgtcgcgc	aggctggggt	gcagtggcac
72841	tatctcagct	tacctcaacc	tcccgggctc	aagtgatcct	cccacctcag	cctcctgagt
72901	ggctggatgc	tgcttctttc	tttttgatgg	ctgcaaaaga	ttccattgta	tagatgtgcc
72961	ataatttaat	cataatatgt	cctctttgat	catttaggtt	ttccaatct	tttgctatta
73021	caagcaaggc	cacgttaaat	atccctgggc	atattatttt	gcacattatg	aagatatctg
73081	taggctaaat	acctgtgtat	ggaattgtct	agtgtgatta	catggcattt	accactttgg
73141	tagataaagg	ttgtatcctg	ttacatgtcc	acggatgaat	ttcttccaga	aatattcatg
73201	tattttgtata	cacatttttt	gagacagggt	cacaaaaccg	ttaacacatt	attattatta
73261	ttattatttat	tattatttca	cattatttag	ggaagtttca	tttttttggt	agctatcact
73321	gataatttct	tatttactca	tcactctgta	ttctcttccc	ttgcacattg	gggaaatgtc
73381	tattctagtt	tttaattgta	atgttcttgt	ggctttttta	gaaaaaatca	aaatgtgcac
73441	attaaaaagt	ttgaatggtt	caaaagggtc	taaaaagggt	ccacagtgga	aaaggctctc
73501	cttcccagc	aggcccagat	ccctcctcag	acacaagcct	gtcgtcagtt	tcctgtgtag
73561	cttcccagag	ttggtcacta	tgtatgcaaa	tacacacaca	tttaaaatat	acacactcca
73621	cgtccacgtg	gaatgatgca	aagcatctaa	gtgcccgtta	attcacaacc	ttgccaactc
73681	agtaatatcc	ttgcgaatct	aatagctaga	aaatgggtga	tctttttagt	tctaattgat
73741	tataatttat	ctattttctg	tgagcttgaa	catcttttca	tataatttaa	agtcattggg
73801	gccagggggt	gtggctcatg	cctgtaaccc	cagcactttg	ggaggccgag	gcaggtagat
73861	cacctgaggt	cagaagttcg	agaccagcct	ggtcaacatg	gtgaaactca	gtctctatta
73921	aaaatacaaa	aaaaaaaaat	taatcaggca	tggtggctcg	tgccgtgaat	cccagctatt
73981	gggaggctga	ggcagaagaa	ttgcttgaac	tggggagggt	gaagttgcag	tgagtggaga
74041	tcgtgccact	gtactccagc	ctgggcaaca	gagtgaagct	ctgtctcaaa	aaaaattttt
74101	taaatgtcat	tggtgtttcc	cttttttgta	aaccttttat	gttctttgct	tagttttcta
74161	tgagggtcatt	ggctttttca	gtgttggttt	ttagtaactc	tcgatttatt	aaaacattta
74221	tacattttata	gctttgttta	tgatgtatac	atttataacc	ttgtctgtga	tgcatatatt
74281	tttccaattt	gtcatctggc	ttttgacctt	atctgtggta	ttctttgaca	atacaaaaat
74341	tttaattttat	atctgatcag	tttcatccag	ttgttttttt	cttttttcat	gattttctgag
74401	ttttgtgtca	tgcttagcaa	gatgctctct	actctgaaat	tattttctgt	aaaatatttt
74461	tttcagccag	gcatagtggc	tcacacctgc	aatcccagaa	ccttgggagg	tagagggtga
74521	aggattatatt	gagtcaggga	gttcaaggcc	agcctgggca	acagagcaag	acccgcctc
74581	tatttttttaa	aagagaaatt	tttttaaaat	actttttccc	atgttttggt	tgagcactta
74641	catttttctta	acttttttgt	cgtgaaacat	aacacataga	aaaaatgta	gtaagtgtac
74701	aacttcacga	attgttataa	attgaacata	tagctttctg	gtactttcat	ggttttaactt
74761	cttacatttta	aatttttggtt	tcatctagac	tttattttga	tataattgtg	aaatagaaat
74821	ccattttttat	tctaaaagaa	cactttttta	atgttcatga	aatgttttaa	aatttattat
74881	ataccaagca	agaaaaaatc	tcaacatagt	cctcaaagca	gaaattgcac	aggacttatt
74941	ctttgtacag	tgtaatgcac	aaaaactaat	aagaaagcct	taaaaaacac	cctttattaa
75001	attactccat	tccaaattat	aatttcaatc	tacttagcac	ataagtattg	atatacattt
75061	atcgaaattg	gccaaaagtg	ttttattatt	ttttaaaaga	aaaagcctag	caatggctta
75121	agcaataaag	tttttaattt	taaagaataa	caaacagcct	cactaaatca	gaggaaagaa
75181	ataaaaagat	aaaagcaaaa	attacagaac	tagaaaaggg	accattccag	caaaaattgat
75241	aaatgaaaac	aaaaatttgt	ttttcaaaaca	taagagttac	caacggctgg	tgaatctaaa
75301	aagaagaaaa	aacaaagtaa	actaaattaa	atgtgaagcc	atgaagagat	ttaaaattat
75361	aagaaaaatag	gccgtgcacg	gtggctcacg	cctgtaatcc	cagcactttg	ggaggccgag

```

75421  gtgggtggat catgaggtca ggagcttgag accgcctgg ccaacatggt gaaaccccg
75481  ctctacaaaa aatacaaaaa ttagctggct gtggtagcat gagcctgtag tcccagctac
75541  ttaggaggct gaggcgggag aatcacttga acccaagagg tggaggttgc agtgagccga
75601  gaccttgcca ttgctctcca gcctgggtgg cagagtgaga ttccgtctca aaaaataaat
75661  aaataaataa agctgggcgc agtggctcat gcctctaate acagcacttt gggaggccga
75721  ggtgggcgga tcacaagggt aggagatcga gaccatcctg gctgacatgg tgaaacccg
75781  tctctactaa aaatacaaaa aatgagctgg gcatgggtgg gtgtgcctgt ggtcccagct
75841  actcgggagg ctgaggaaaag agaatggcgt gaacctggga ggtggagggt gcagtgaagt
75901  gagatcacgc cactgcactc cagcctgggc gacagagtga gactccattt caaaaaaaa
75961  aatacaagaa catattatat acaactgtga gctacaccat gtttgaacat cttgacaaaa
76021  tgagcaactt tctcaaaact aaattgccaa atgttcattt ttaaaaagcc aaaaataacc
76081  aaccaacaca atgaggataa atttaaagt atcaagtttg atttttttta aaaactgttc
76141  aaacatcttg gtagtgtcgg gcaggaagtt gcctttcatt ctgggtgaga tgagaaggct
76201  ctaaggggca taggacctga tgcacatggg cctgatgcag gctctgtctt aatagctgac
76261  tcttgcgtgg agtaggttat tgggggatgg gtggacagag accagggagg aggtgtgtgc
76321  aggaatccca gtgaaaaatg atgggtgtcca ggctaggcca tagcagtaga ggaagcaaga
76381  tcttggaaatg cacttggaaa atgaagccat ctttgggctt gagctcaagg aagcatgaag
76441  ctgcccctaa ctgaagtggg gaaggtggtc tggggagcag tttaggagga gagatcagga
76501  gctcagtttc ggacttggaa attttgaac gcacatgagg catccagggt gagttgggag
76561  aattaaataa tgctgaaagg tactcacttg gcaagtagca aatattcgct atattgtctg
76621  ttcaactttg tcaactgctt ttccagtaga aatgtagtgt ccttatcaca catgcataaa
76681  tgttaaactc aaaaagtaaaa tgaaatatat tctcagtaga tatgaataac tttttaattt
76741  ttttgttttt tgacatggcg tctcactctg ttgccaggc tggagtgggg tggcgagatc
76801  atagctcact gcagcctcaa actcctgggc tcaagcaatc cctcgccaca gcctccgag
76861  tagctgggac tacaggcaca caccaccag cccagcta at cttttatttt ttgtagagac
76921  tgagttgcac aatgtagccc aagctggtct ccaactcctg agctcaagct atcctcccac
76981  ctcggcctcc caaagtgttg ggattacagg cgtgagccac tgcacctggc tgctttttta
77041  ttgtaatat catcctccat ccactcact actgtcaaat atttttcccc acctattgcc
77101  ttcctatttc tcttttattt cacgtcattt agggaaagtt catttttttg tgagctatca
77161  ctgataattt cttatttact catcatcttg tatttctctt ccttacacat tggggaaatg
77221  tctattctag ttttaattgt aaattgttct gtggcttttt ttaaaaaaaa atcaaaatgt
77281  gcacattaaa aagtttgaat gggtcaaaag gtctcaaaa ggggtccacag tgggaaaggc
77341  tctcctgtcc cagcaggccc agaccctcc tcagacacaa gcctgtcatc agtttctgt
77401  gtacgttccc agagttgggt tctatgtatg caaatacaca cacatttaaa atatacacat
77461  gccacagctt tttaaaattt gaatttatgg gccatgtgca gtggctcacg cctgtaaccc
77521  caacactttg ggaggccgag gcaggtggat cacctgaggt caggagtctg agaccaacct
77581  gaccaatatg gtgaaacccc gtctctacta aaaatacaaa aattagctgg gcatggtggt
77641  ggggtgcctat aatcccagct tctcaggagg ttgagacagg agaatcgctt ggaccagga
77701  ggcagaggtt gcagtgaagt gagatcgtgc cactacactc aagtctaggc gacagagga
77761  gactccgtct caaaaaaaa aaaaaaaatt gaatttagac tcaggtgcag aggtcacgc
77821  ctgtaatccc agcacttacg gaggctgatg aggggagaat cacttgagtc cagtagttca
77881  agaccagcct gggcaacaca gggaaactat gtctctacaa aaaaattaaa attagcctgg
77941  catggtggag tgtgcctggt gtctcaccta ctcaggaggg tgaggcaggg gaatcacttg
78001  aactcaggag taggaggctg catgagctat gattgcacca ctgcactcca gcctgggtga
78061  cagagcaaga ccctgtgtca aaaaaaaaaa aaaagaaaag aaaattagac taccatcata
78121  gatgggtacaa acacttccca gtttgttgct ttcgttttgt ttgttgccat tttactata
78181  cagaaaaaaa aggcaataaa gaatacatta ttataatatg ttaatttcta ctgcattatt
78241  tttacaactt cattgaggt gtaatttaca taccgtaaaa tctatccatt ttaggtgtag
78301  gattcagtga tttctggtaa atttactgag ttatgtgacc atcaccacaa tctggttttg
78361  ggacattttc attactgcca taatattcct caaaccatt tagaatcatt cctatttctg
78421  ctcccaggcc caggcaacca gtaatttact tgcgttttca atagatttgc cttttctgga
78481  tgtttttacat aaatagaatc atacaatacg tgatcttttag tgatcttttt tcacatggca
78541  taaacttgggt tcctttttat gttgaataat attccattgt atagatatgt cacagtttgt
78601  tttctccattc atgagctttt ggttatattg gttagtttca ctttttgact gttatgata
78661  atgctggtac aaacattcat atacaagttt ttgtgtagat gtatattttc atttctcttg
78721  gaatagacct aggcgtggaa ttgctggatt agatggtaat tctatgtgtt tacattctaa
78781  ggcagggggt cccaacccc gcaggtgggt agcgccatc ttcagtgctg ttcatggcct gttaggaact
78841  ggcgggcaca gcaggtgggt agcgccatc gggcagtagt tactgcctga gctctgcctc
78901  ctgtcggatc agcgtgcca ttagattctc ataggagcac aaaccaggt gtgaaatgag
78961  catgtgaggg atctaggttg cgagtttctg atgagaatct aatgataaat gtaatgagct
79021  tgaatcatcc cgaatccatc ccccaacccc aacccccgtc cggggaaaaa atgactcttc

```

79081	atgaaatcag	tccctaggcc	aaaaagtctg	gggactgctg	ttctaaggaa	ctgccaaaa
79141	tgccaaactg	tttttcagag	tggtcgacc	attttacatt	cccaccggca	atatatacgg
79201	tgctctgttt	ctttacatcc	tcatcaacat	gtgtcttttt	cattacagcc	attctatgtg
79261	gggtgtgaaat	gctatgtggc	tgtgtttttc	atttccatgc	agaaattttt	aatttaattg
79321	cttaggttaa	aataattcct	taaattttaa	acactcatat	tgccatatgt	atatttttat
79381	actacaaagt	gatacaattt	ttgttaattt	tcttgccctg	attactcttt	acctgtatag
79441	tatttaaattc	tttacataag	atcacaaat	tagtgaatag	taatttatcc	aactcaaaat
79501	cttcatagga	tttagaaaat	ttaagtcctt	taccaaaggg	attgacttYt	aacttcatta
79561	aagggttgca	acagtatcaa	atccttggtg	aagccacatt	caatctttgg	cactccagga
79621	ttttgagcta	taactgtagt	gatcactaat	atgtcatttc	taagctgacg	gtcataatga
79681	ctaaaacctc	tcatagattt	taaaatactt	ccttcaaagt	cagtaaacad	tccaagtta
79741	taagctgttg	aacaatttct	tattttgaag	attttttctg	ataagttcca	aagtgtttct
79801	gatgaaggaa	ataaaagctg	tccagagaaa	tctgagtcac	tgaggtgagc	acagattcca
79861	ttggctgctt	gtgctttcat	cattacagta	caattaactt	cagaagtcga	gagatgctgc
79921	agaattttta	gtaccctaa	tttctcaaca	agttgatttt	caagcaaggt	cattaactgg
79981	gccattgttt	ttgccaatcc	tccaactcca	gccatttgaa	tcttgatga	tgaactcact
80041	tgctggtta	ctggaatatg	ctcctttggt	ggttggtgct	gataaaagtc	aacaatacgt
80101	ttacaatttt	ttatcctcaa	ttcagaactt	ggtattttca	ttaagtcacc	cagaagcgca
80161	actgaactag	cagtatctcc	agcataagtt	atttcatccg	atactttctt	tttcaaaaat
80221	ggcaagccac	actattttat	gatcatcat	gcagattcta	caaaatgcgg	ctggttttca
80281	atttttactg	cacacagatt	cagaatttca	aatgtctgta	ctaaatccct	taagggaagt
80341	tcatctctgat	aacactgtac	cagtttcttg	acagatttaa	gttgcttttc	ttctaagcct
80401	tcttttagcag	tctcttcaaa	aagtttgatg	acaccattaa	ggtccacagg	cttcaaaa
80461	ccagttccac	atggcgaggg	aggccttggg	aaacatcatc	atgatggaag	gcaaagggga
80521	agtaaagacc	ttcttcatgg	tggcaggaaa	gagacagcat	attgctatgt	attttaacac
80581	cacttatttc	cccccttttt	tctttcaata	tcatggatta	aatagtgtat	tttaaatgag
80641	tgtgaggtc	acttggaact	tattccatcc	ccttgggcaa	tttttttcca	tttttaattc
80701	aagaatctta	aagtttgaat	gatggtcacc	ttgttatata	ttttattatg	tttggaagct
80761	tttttgctat	tgtctgatcc	tcccaacaaa	tagccttttg	atagaattgc	ctttattcgt
80821	ttctttatat	ctaattctaa	cttaagatta	gacttaaaag	taacttcagc	ggtttttatta
80881	tgaatatatt	aaggcatata	aatactgcct	cctttctcta	aatgactgct	aatataattt
80941	taccaagttc	tgtaaagta	tctgttgta	cataaagtgc	tggtgttttt	tatctgcctg
81001	ttaaacttaga	gtgggtttta	ttttctttca	ccttctgtgg	tcgaaggcaa	gtatgtctta
81061	gtcagtttgg	gctgttataa	tgaaacactg	tagactgggt	ggcttaaa	acagaaactt
81121	gtttctcag	ttctgaaagc	cggaagtc	ccaatcagg	agccagcagg	cctggtgtct
81181	ggagaggatg	cgcttctgg	tttgagacg	gcaccttctc	attgtgtcct	cacagggcag
81241	agagcaaaaa	gaaagggcaa	gcgtctcca	gcctcttctc	ttttcttttt	ttttttgtt
81301	tgtttgagat	ggagtcttgc	tctgttgccc	agactggagt	gcggtggcat	gatcttggtc
81361	caatgcacac	tctgcctcct	ggcttcaagt	gattctcctg	cctcagcctc	ctgagtgcct
81421	gggactacag	gtgcctgcca	ccatgcctga	ctaattttta	tggtttttatt	agagatgggg
81481	tttcatcatg	ttggccagac	tggtttttaga	ctcctgacct	caagtgatct	acctaccttg
81541	gcctcccaaa	gtgctgggat	tacaggcggt	aaccacgcga	cccggcctcc	agcctcttct
81601	tgtgagggca	gtaatcccat	cataaggggt	ccacctctt	gacctaatca	cttcgcaaag
81661	gtcccacttc	caaataccat	cacactgggt	atthaggtct	caccaggtga	attggtgggg
81721	gaggtgggac	acaaacattc	agtccacggc	aagtttttat	ctcaatttgc	ttaaagcctc
81781	ctttatttct	cctgttacag	tgtgataatg	ttttttaaaa	tatcatttag	ctggctgtgg
81841	tgaccatgc	ctgcagtccc	agctactcag	gaggctaagg	caaaaggatc	acatgaacct
81901	aggagtttga	atccagcctg	ggcaacatag	aaagaccctg	tctcttaaaa	aaataaataa
81961	ataaataaat	aaataaataa	ataaataaat	aaataaagga	aagaggctgg	gcacagtggc
82021	tcatgcctat	aatccagca	ccttgaggag	ccgaggcg	cagatcacct	gaagtcggga
82081	gttcaagacc	agcctgacca	acatggagaa	acccttctc	tactaaaaat	acaaaattag
82141	ccgggtgtag	tgccacatgc	ctgtaatccc	actacttggg	aggctgaggc	aagagaattg
82201	cttgaaccag	aaggtggagg	ttgtggtgag	ccgagatcat	gccattgcac	tccagcctgg
82261	gcaacaagaa	tgaaactcca	tctcaaaaaa	aaaaaaaaaa	aaaaaaagaa	agaaaaagaa
82321	agaagcactt	aaagaggctg	aggcaggcag	atcacttgaa	gtcaggagtt	caagaccagc
82381	ctggccaaca	tggtgaaacc	tagtctctac	taaaaatact	agaattagcc	agacgtggtg
82441	gcacatgcct	gtaatcccag	ctactcggga	ggctgaggca	tgagacttgc	ttgaacctag
82501	gaggtggagg	ttgcagtggg	ctgagaacat	gccattgcac	tccagcctgg	gcaacagagc
82561	aagactccat	ctcaagaaaa	aagaaagaga	gagaaagaga	aatatagaca	tatgttatta
82621	gtcccccagg	acctcttcaa	aagatctctc	ttttccttct	ttattttctaa	ttaccatact
82681	acataccacc	tccattatgt	cagaatgtgc	cctatttacg	tggaattgtc	ttaagtcatg

82741	gaactctgag	ttacattccY	cgtattttcac	agagacacaa	tcagagcaca	cgctgatctt
82801	ccgcctctct	tcatttcctc	catgtactct	gtagctacct	gttctcttct	ttgttcgtag
82861	gaagatctct	gttgcgtggt	gtgggagttt	gtgccagctc	atctttttat	tgtgctttct
82921	gtgagcagct	atcaatgcct	ccaggctctc	tctttaagaa	gaatgtttac	tctcaattgt
82981	ttaaaaaact	aactaaatag	gaagaagatt	gcaaatccta	acctttttgg	ggttttatat
83041	tgggggcaaa	agttggcatc	tcagtaagg	attatttcat	tttcatctga	ataaatgagc
83101	agtaataact	ttgctgactt	gcagggctca	ttgtgatgcc	aaaggacatt	gtaagggtgca
83161	tatctgaatt	ggaggaggaa	gaggggcatc	ctctgagcca	gggtgtggcag	gaggtgacat
83221	caaggagggt	taggctgcgt	aaacccaggg	acacaaggag	ctgcagtcgg	ggaagaacaa
83281	ggctagcgg	atggagttgg	ggggactgtg	tctggagcca	atgttctcag	atgtgtctcc
83341	ggcaggcagg	ggcaaggggt	gggtgcctgg	ttacagcatt	ccttttgagg	tctggaatag
83401	tggggaaaac	tccctgtctt	ctctcccctt	aggagtctgc	actatggaaa	caacctgtca
83461	atccagctca	aggcacacat	agcccagaca	cccatgagac	cctctccgtg	gggaccctag
83521	agcacctatc	atgaacgagg	agaccaagta	gggtattttt	ctctcccctt	cacctcctct
83581	tttcccctcc	tatctacttc	gtcacttttc	tcctactgcc	aagactggtc	cctacccaaa
83641	tctgccttac	tgggctgccc	ccaacacaa	aaacctgccc	tgaccatca	tcagcatga
83701	gaatgtaatg	atcagacaca	gaaaatcagg	aagagttttg	agacagcatc	taatctaccc
83761	atttttagaga	tggtagtact	gaggcttata	taggaaaaag	gcttgctcaa	ggtcacacta
83821	tgagtgtatc	agctaggata	ggccaggtta	caactgtagta	catgcacctt	ccaaagtccc
83881	agtactcat	ggcaacaaaa	gtttatttcc	tgctcttgct	tcctgtctcg	tgtggattga
83941	ctgggattgc	tcctccacat	catcctgtct	cccacactca	ggctaacagg	gtagccatga
84001	tttgcaatat	ttctggtccc	tggagtagaa	aaaaagaaaa	agtactgtca	attacacctt
84061	ggttcttaaa	acaactacag	gcatgacatg	agtctttttt	agcatgtttc	attgacaaaa
84121	gcaagtttca	tggctgtgcc	caatttcaag	gaggcagaga	agtgtaatcc	caccaaaggg
84181	ctagaagag	gagaaagagt	atctgtgaac	agccctaagt	cctaccacag	agaattagta
84241	acagagctgg	gccatggatc	tttcaaccat	cgctctctgt	ctccaagatt	attccccatg
84301	gaaatctcaa	tgactgataa	tgatggcatg	tgctttttct	cctgaggatg	gttagcctta
84361	aagagatttg	tgtcatatcc	taaggggata	gaacactaat	gatggaaaca	aaggattatg
84421	gttagactgg	ctggaggaga	aatttgagga	tgagaaacat	caccagaaat	cacaccatcc
84481	aggcactact	tacttccatc	tgggtgcatg	ctgccctgga	ccatttcttc	atgggtagca
84541	tggatgctgg	acaccatagc	ctggaaaaga	agttatgccc	taggctatgg	ccacatcctt
84601	ttgccgagat	cacacaaaat	ccagggaactt	agccttgtct	ggtgccatct	aggcctccaa
84661	ggccttgga	atttactggc	ctgggaggca	agaaacctca	gttctcctcc	tgctctgtct
84721	atggacttgc	tgtgtgactg	tgggcacacc	ctttgccctt	ccttggccat	ggcttttccg
84781	tctgcttagt	ggagggtggt	atccctgcct	gaggatcatg	gtgtgagcat	gtttcataaa
84841	ttctaagact	ctctgcctga	gtgaggacct	attgctatta	gcccagttga	ggagaaatga
84901	ccagtggggc	tgacagtaca	tccaagtatg	tctctactgc	atgcccaggg	agcagctggg
84961	ctctaaaccc	caggacgcag	agtactggcc	tcagcctctg	ggaattggga	aggctggcctt
85021	ctgggtggac	ctcctactct	tttcagagtt	agagggtggac	tctctggagt	tgtgaggata
85081	aaataaggta	tataaagcac	ttagacagtg	cctaatacac	agtgagtgtc	ttccaagtgt
85141	gtactgctat	gaggaaggag	atagtaccag	aaagtacatc	cggaatgtg	atagcatagt
85201	ccactagatg	atggaccacc	atttagttgg	ccaatcccca	actgttggac	atttaggttg
85261	tttccaattt	ttaataatta	tataaatctt	tgcatgtgagc	atctttgcaa	ttaaatattg
85321	tatatacgtt	catgatcggt	tgccaagggt	agagtccctag	aaatggaatt	actgaatcaa
85381	aggaactgca	cattatttag	gctttttgtg	tgtaaatgcc	ccgtgccctc	tattggtact
85441	tctagaagga	ggtggtttaa	gagttccagt	tcggccatca	tgatggctca	cacctgtaat
85501	cccagcactt	tgggaggccg	aggtgggcag	atcacccctga	ggtcaggagt	ttgagcccag
85561	cctggccaac	atgggtgaaac	cccatctgta	ctaaaaatta	caaaaaatag	ctgggcattg
85621	tgggtgtcac	ctgtaatccc	agctactcgg	gaggctgagg	cagaagaatc	gcttgaaccc
85681	gggaggcgga	ggctgcagtg	agccgagatt	gcaccattgc	actccagcct	gggtgacaga
85741	gcgagactct	gtctcaaaaa	aaaaagagtt	ccagttcaga	agggaaagaat	ttgcttagca
85801	aaagaggtga	tgggtctgtg	tagctaggat	tagagtccac	tgtgagtagc	agaaagcact
85861	aaacaacagt	ggcttaacga	gaatggaagt	gtatttccct	gccatgtaac	agaagtccaa
85921	agtcagttag	cacagggcag	atgggcagct	ttaccttcca	ccttcctcag	tatgggttcc
85981	acctcatgat	tcaatatggc	tgcccaagat	ccagccatcc	catcaacaat	ccagacaaca
86041	ggaaggagca	aagaagaata	gacaacattt	ctacttacat	tccactggcc	aaattacatg
86101	ctacacata	actgcaagg	agactgggat	ataataatct	attctagatg	accagagaat
86161	atttagtagt	tctaatactg	aggaagaagg	gaagaacaga	ttttgggaga	caactagtgt
86221	tctctgccat	gaggttagct	cagactgaga	gcagcataaa	tgggttcatgg	aaataagaat
86281	gagtaatgca	tcctcacggg	actgtccaca	ggggatgaac	aagaccattc	cagagagcca
86341	gggtgcaggc	acaaatggag	tagggagggg	gtgcagaaga	aacagactga	tctctggagg

86401	tgatccctgg	gcagagacat	caagactcca	tggagaggcc	acttccctgc	ctattttatg
86461	tcKctcaaat	gtagggactg	gttcttgact	gcttgacttc	cctagaaact	cccttatccc
86521	ccaactcacc	ttScccagat	caccttcccc	ctagttcatc	tgtacccac	tcacctgccc
86581	tcaggtcacc	tgccccacaa	ctcacctgtt	ctccatctaa	tcttcctccc	agctcccttg
86641	tccccaaat	cacctgcccc	caatttgctt	gtcctccagc	tcaccgggtc	cccagctcat
86701	cttctctcca	gttccctctg	ccccagctc	acctgcctgc	cctcagttca	cctgtccccc
86761	agttcatctt	cctcctagct	cccctgtccc	ctagctcacc	tgtgccccag	ctcccctgtc
86821	ccccagttcc	cctgtccccc	agctcacctc	cccctcagct	ctcctgtccc	ccagctcatc
86881	tgccccagt	ttacctgtcc	cctagctcac	ctcccccca	gtttacctgt	ccccagctc
86941	acctcccccc	agtttgcttg	tccccagct	caactcccc	caagttcccc	tgtccctcag
87001	ctcatctgcc	cccagtttRc	ctgtccccc	caactcacct	atcttccctg	tccctccagg
87061	gctggctcct	catggacccc	gttggctccc	agctcggcaa	caagaacctg	tggagctgtc
87121	ttgtgaggct	gctcaccaaa	gaccagaat	ggctgaacgc	caagatgaag	ttcttctccc
87181	ccaacacgga	cctggattcc	aggaacgaga	ccttgacccc	tgaacagaga	gtcatcctgc
87241	aactcaacaa	gctgcatgtc	caggggtcgg	acacctggca	gtctttcatt	cattgtgtgt
87301	gcatgcagtc	ggaggtgcct	ctggacctgg	aggtgctgct	gctgagtact	tttggctatg
87361	atgatggtaa	gggaggtgtg	gagagagcga	aagcagccgg	gccagtacct	gcgtcatggg
87421	gagccgggag	gagcccagg	accaccta	gtcagagaga	gggtgtagcc	cagccacgat
87481	ctcaactcta	tatttctgga	cacttcccag	aacaaatttc	ctaattgcgc	caaactctgt
87541	ggggcctgga	ggaccctccc	ttctacctgg	cttcactcga	attgctcgaa	ttgctgagtg
87601	actgcttcca	gccacaaaat	cccacatagc	ccataatgcc	cgagagattt	atttcttctt
87661	ttttggcggg	gggtgggggg	tgttttttgt	ttgttgttgc	tcttgttggg	ttttgtttgt
87721	ttgtttttta	tttttgagac	aaggtcttgc	tctgttgcc	aggctggagt	gcagtgccac
87781	aatcatagtc	cactacagca	tccaactcca	ggactcaggt	gatccttccc	acttcagcct
87841	cccaagtagc	tgagactaca	gtagaactat	aggtgcatgc	caccacatta	ggctaatttt
87901	tcattctttt	gtagagacag	gacatcactg	tgttgcccag	gctggtcttg	aactcctggc
87961	cttaagtgtat	cctcctcccc	tgccctccca	aagtgtctgg	attatagatg	tgagccatca
88021	cactctggct	gaggtgtttt	tgtttgttgc	tttgttttgc	aacatgggtca	gaaacagtga
88081	cggggagcgc	cttctgcctc	ctactgatcc	gtggggattt	cttgggcacc	ttctgtttgc
88141	acagcactga	ggggaaacac	aggacattga	ggggcaacag	cgtttttgga	gagaaaatgg
88201	gaactcactt	aagaacccta	cttcaaggca	gagtgtggga	attgcggggg	gcggggcgcc
88261	gcattgcacat	atgtgcagac	atatgcagat	acacacagtg	catatacatg	tgggtatgtg
88321	cgtaaacccta	tgtacacatg	catgcaagtg	tgcccacatg	cataacacat	gcattgctgt
88381	gcacacacat	acataaactt	gcattgcactt	gcataatac	acatttctgc	ccagcactgc
88441	cttcaaagct	caccaccaca	tttctccac	aacagataac	tgagtgttcc	atttagttct
88501	cccttgctgg	gtatctccct	gtgagatgag	ccctgagcca	ggcgccaggc	cagagctggg
88561	cccagcactc	cctcgacagc	cccataccac	attatactct	cccctctctt	gcagggttca
88621	ccagccagct	gggagctgag	gggaaaagcc	aacctgaatc	tcagctccac	catgggtagg
88681	actcggagtg	gggggtggga	aggggtgggt	gagcactgtg	aagtccccac	ttccaaagt
88741	gaggaggctg	tggaggctgt	gggtgctggt	cacagccatt	tctcataggc	catgctcttc
88801	gtctgtccct	gacccatttg	caagtgtgtc	aagcccctaa	ctgtgtctcc	cagccccacc
88861	tcctctgca	gtgactttca	aggctttagc	ttgtcccgtt	accaattctM	aagggtctaa
88921	cctggaaccc	ctcaggaagc	ctgttctcac	tttcYtgccc	gcaacccgca	gggctctatc
88981	tcccagcccc	aaagtgtcag	gcttcatggg	gaagccctaa	Ycaccctctc	ccgacttgta
89041	caccttgga	ttgacRctca	cccacagctg	ctgtcttcag	cgggggagcc	tttggtgat
89101	tttctgaagg	agctcggga	ggccagtgtg	taaataatga	ccacctactg	attcgtgggt
89161	cacactttca	tctcagcacc	ttgatttcta	cagaagcatt	gactttactt	atcgctgtgc
89221	atggcagtaa	tgccaacaga	aaaccacccc	tataacctca	gctccccagt	gaatcaaac
89281	tgccaagtc	cctgggtccaa	taggcccgc	tcactgagct	ggcatcatta	tctcatggct
89341	gtaaccagat	ctgattgata	tttggccagt	gagtcccttt	ttaatatagg	atttgttaag
89401	atattgaagt	gctctcgaac	tggttccagc	ctcctagctg	gacaaggagc	ccaggggccc
89461	gctccagggg	ctgttcttat	tggtcactta	gcttagctgt	aggaggaccc	tgcttgactt
89521	cttaaaattc	tttcttgagt	cctcttctct	ttctccctcc	cttcttctct	gggtccctct
89581	ccttcttgtt	ttccttcttc	ctttctcaaa	cttctccaga	aaggcattaa	agtgattgtt
89641	gaaaaatccat	acaatgagac	aagactccag	aaactattaa	gggaagtgtg	gaaatgtggg
89701	tgataagaaa	tcgggatgat	aaaaccctaa	cagaggaggg	aggttgagag	cctggccaaa
89761	ctcactggga	acttcactta	tatgaccacc	ggcggtctcc	atagagcttg	gtccttccct
89821	gatggacaga	tggtccattta	gtgcttggag	ctgagtggtt	ctRggggctg	ctggctgtYg
89881	gcctgtcttc	ctgcactcctg	gactgcaaga	ctgccaggcc	cagaacatcc	accttccaat
89941	gggggtgcct	agaagtccac	tctgcaaaata	gaagctgggt	ttgaccagc	ctctgcctgc
90001	tgctgtcctt	tccagtccct	gcattgtgggt	gtacttggt	gcctgccacc	tgtctgtgga

90061	ctggaKttcc	ccaaagggttc	tgggtaacc	ctcagccag	Rtccccagac	cccaactctc
90121	caccccttcc	tttgcttttt	caggcctgaa	gcgcccacat	cagagctgtg	ggctcctcacc
90181	ccgcccgaag	cagtgcaga	agcagcagct	aggtgggtac	cagtgtgggg	aggaacataa
90241	acagagagat	ggggttgcct	gggggccaag	acccggaccc	tggacctgt	cccctgcaa
90301	taagcctcca	gaggcccagt	gactctgttc	tcgcaagt	ccaggagaaa	aggactggag
90361	gtcttgacac	ggcagaggag	aggcctgggc	tggcagcgaa	ggggctcccc	acccatctgg
90421	ctgcatgggg	acttctctga	agagggtccc	gctgaaggag	ctggaagcac	catacaggtc
90481	tcagcttcgc	tgtccaggct	tttccaggga	caccctatgt	cctcagtggt	gaaggagacc
90541	cagggaggag	accagtttgg	gggtgagcag	ggatggggag	gggtgaggag	gcctgggaga
90601	aaccttcaag	acagaggccc	tgggggcca	tggggagaca	tggagctgct	tagggcaggc
90661	caggccagt	agagaagaaa	ggggacttct	ctcattcttg	accagtcttc	agaatggtcc
90721	tcgttctcca	cgagtgttc	cactaactag	agccttctct	gccccactg	ctgccaacca
90781	tggctataac	cagaggattc	acatccgctc	aaaatagttc	actaccttgg	cctttcccca
90841	tagggttccc	ccaaaagcag	ccccagccct	ttccctgggt	cacctgagac	ctctcaatga
90901	cccaggaatt	aaaagggtta	catctggcac	tgtagggg	cagctccccc	agttccgac
90961	ggtaatgcct	aggcctacag	gttgtagtg	ctcaccctg	ggcattgcag	aactgaaata
91021	ttgggaagRg	gcactgggga	tccagatatt	acagaaagag	ggtgttcaa	taagatatgt
91081	caaagtagct	gggcgcggtg	gctcacacct	gtaatcccag	cactttggag	ggctgaggca
91141	ggtggatcag	ttgagcccag	gaattcaata	ctagcctggc	caacgtgaca	aaacctgttc
91201	tctactaaaa	atacaaaaat	tagctgggtg	tgggtggtg	cacctgtagt	cccagctact
91261	caggaggctg	aggcaggagg	atcacttgag	accaggagtt	tgcggctaca	gtaagctagg
91321	atcggtccac	tgcactggag	cctgggcaag	actgagactc	tgtctctggg	aaaaagaaa
91381	aaaaagagat	gttgcaaagg	aggtgcctta	ttccccctcc	cccatcttac	tgaMccctta
91441	caccacgtgt	actattgcag	aatggataga	accgtgacct	acacttcccc	attccccact
91501	gcctgtttta	atagctaccg	gagagcctat	gctcccttag	aactgattcc	ttctggaagt
91561	tgggggtgga	cagatcccc	tatgggtgctc	ttgacacccc	caccctcacc	ccatcataca
91621	tacacatctg	gggctacagg	ctcccaacag	ccaatactg	gggcaagaag	acatgagcag
91681	agggccgggg	ggctcctctc	tcattgcctg	tccttgcccc	ttgcagagtt	ggccaagaag
91741	tacctgcagc	tcctgcggac	ctctgcccag	cagcgctaca	ggagccaaat	ccctgggtca
91801	gggcagcccc	acgccttcca	ccagggttat	gtccctccaa	tcctgcgcg	ggccacagca
91861	tccttagaca	ctccggagg	ggcctattag	ggggacgtca	aggtggaaga	tgggtctgac
91921	gtgagcatct	cggacctctt	caacaccagg	gttaacaagg	gcccaggggt	gaccgtgctt
91981	ttggggaagg	ctggcatggg	caagaccacg	ctggcccacc	ggctctgcca	gaagtgggca
92041	gagggccatc	tgaactgttt	ccaggccctg	ttcctttttg	aattccgcca	gctcaacttg
92101	atcacgaggt	tcctgacacc	gtccgagctc	ctttttgac	tgtacctgag	ccctgaatcg
92161	gaccacgaca	ctgtcttcca	gtacctggag	aagaacgctg	accaagtcct	gctgatcttt
92221	gatgggctag	atgaggccct	ccagcctatg	ggctcctgat	gcccaggccc	agtcctcacc
92281	cttttctccc	atctctgcaa	tgggaccctc	ctgcctggct	gccgggtgat	ggctacctcc
92341	cgctcaggga	agctgcctgc	ctgcctgcct	gcagaggcag	ccatgggtcca	catgttgggc
92401	tttgatgggc	cacgggtgga	agaatatgtg	aatcacttct	tcagcgccca	gccatcgcg
92461	gagggggccc	tggtggagtt	acagacaaat	ggacgtctcc	gaagcctgtg	tgcgggtccc
92521	gcactgtgcc	aagtcgcctg	tctctgcctc	caccatctgc	ttcctgacca	cgccccaggc
92581	cagtcgtggg	ccctcctgcc	caacatgact	cagctctata	tgcagatggg	gctcgccctc
92641	agccccctg	ggcacttgcc	cacctcgtcc	ctactggacc	tgggggaggt	ggccctgagg
92701	ggcctggaga	caggggaagg	tatcttctat	gcaaaagata	ttgtctccacc	cttgatagct
92761	tttggggcca	ctcacagcct	gctgacttcc	ttctgctgct	gcacaggccc	tgggcaccag
92821	cagacaggct	atgctttcac	ccacctcagc	ctgcaggagt	ttcttgctgc	cctgcacctg
92881	atggccagcc	ccaagggtga	caaagacaca	cttaccaggt	atgttaccct	ccattcccgc
92941	tgggtacagc	ggaccaaagc	tagactgggc	ctctcagacc	acctccccac	cttctggg
93001	ggcctggcat	cctgcacctg	ccgccccttc	cttagccacc	tggcgaggag	caatgaggac
93061	tgtgtgggtg	ccaagcaggc	tgtgttagtg	caggtgttga	agaagtggc	caccgcgaag
93121	ctcacagggc	caaagggtgt	agagctgtgt	cactgtgtgg	atgagacaca	ggagcctgag
93181	ctggccagtc	tcaccgcaca	aagcctcccc	tatcaactgc	ccttccacaa	tttcccactg
93241	acctgcaccg	acctggccac	cctgaccaac	atcctagagc	acaggagggc	ccccatccac
93301	ctggattttg	atggctgtcc	cctggagccc	cactgcccctg	aggctctggg	aggctgtggg
93361	cagatagaga	atctcagggt	agtaagagtg	gaggaggacc	ggggagggga	ttgggctttt
93421	gggggagcag	aggccaacca	gtctagcaaa	cctctgcca	gaggactgga	taagaatctt
93481	gaatatcaga	acataatggc	ctgcaatgca	agagagggaag	ctccataacct	tgacaggacc
93541	tctggagtcc	aaatggatcc	tcctctgtgc	tgtggtttct	ggactctcag	tctctctgtc
93601	aatcatgggc	tgaaccaca	gatccaggct	gtctaYagag	gctgggtggac	tttgggcaag
93661	tatatggagc	acacacatgc	acactgtcta	ggccagagtt	tcttcgttcc	taaaacgaat

93721	ctgtaacaat	agccaactca	tatggtcatt	gcaagaatga	gatgggatgg	tgcataaaaa
93781	acatttttga	gcacagtgcc	tagcacagag	caaaggctca	gtgtgcatat	tagctagaga
93841	aaaggctagg	ctycagtaac	agagaaacct	cctcccaaaa	tacagtaggt	taaataatgt
93901	agaattttat	ttctctctca	tggaaagagtc	agaggttaggt	ggtccagggtc	agtggaaatgg
93961	ctcagctcca	cgcagtcattg	caggtaccca	ggtccctccc	attttgctcc	attatccct
94021	tgggaatcct	atctgcacag	tcaaagctac	gtcatgggta	tatctgtgct	ctggcttggg
94081	aacaaggaaa	gagcatggag	gaacatgtca	atgcattaaa	gttcagtcct	gaaactagga
94141	tacatccctt	ccactcacat	tccattgggtg	agaacatagt	cacctggcca	cactgagctg
94201	caagggaggc	tgggaaatgt	gatctctggc	tgggaaacca	tgttcctcat	gatagctcta
94261	ttgctgtaga	tgaagtggag	aatgggcttt	ggtggacgat	tagaagtctc	ggccataata
94321	tgtatttgtt	agtactactg	tattaagccc	catctctctg	aggggatggc	gatgacttct
94381	cagctctgcc	cagcactgat	cctctgacac	ttcgcttctt	cttatggcag	ctttaagagc
94441	aggaagtgtg	gggatgcctt	ctcagaagcc	ctctccagga	gcttgccgac	aatggggagg
94501	ctgcagatgc	tgggggtgagc	cagggccttg	agctgagaag	ggtcttcagc	tggggatgcc
94561	tggtagctct	ctccctctcc	ttaatcttac	acaaggcaga	ttcctggccc	cgcccttttc
94621	ccctccctgt	tcctccccc	catctttgct	tactctgtag	gtagcagga	agtaaaaatca
94681	ctgcccagg	catcagccac	ctgggtgaaag	ctttgcctct	ctgtccacag	ctgaaagaag
94741	tcagggtgagt	gatctccagg	agggctcact	gactggggag	atgagccact	gcccagggtcc
94801	cagagtcccc	ctggggcctg	catgttcctc	caagtctgac	cagtagtttt	tcagttagac
94861	ccagagagg	aaggcatcag	tccaagtact	cagtagggct	gagtccaaac	ccaaggctcc
94921	cagagtcccc	agagcaaggc	ttccttcac	taatatatta	gactgtcttg	gaggagcatg
94981	agtgttaagg	ctccctccct	ctttctgaaa	tcccaggaga	agggatagca	gtgcgtaggc
95041	aggaatcagg	cactgtgggt	acacataact	acatgaagca	ccacacacct	tcacatttgt
95101	tcacacatgt	ctacacttgc	acagaagtac	acaggcatat	gcaagaatat	gcacccacac
95161	atgcccactc	ataggtgtgc	acatgtatgc	agcgcacaca	tgcaccttta	actacatgta
95221	cacattttga	tgccagcaca	ctctaactaa	ctaagcttgt	atgcacaaat	atactcctgc
95281	cctgtgtctg	ggactcagta	ccatggggag	gagtgggacc	agtgaccctc	ctccctggga
95341	gaacgtctgt	agtttatatg	gcacctttat	gacatttaga	gaaggcacca	cttcctccac
95401	acagatgcag	cctgtcacta	aggttcagca	cttgtttgagt	gaaaaataata	agttggacca
95461	cagtcacctat	tgtcgtctcg	gctgggcatc	tgtgaaccgt	gattaagcca	aggttcagaa
95521	gtactgaact	tgttgacatt	ttctctccct	ggctattgaa	agtgaacttta	atttgtctt
95581	tcacacacca	ccattgttct	taatcacctc	cactccctc	aactcatctg	tctccccagc
95641	taggaaccca	ggcaaggctg	gcttgtgaac	aggtggggaa	agtgagggtca	gagaggaaatg
95701	cgcttggtct	agggctcttg	gtgagtcagg	gccacagccg	aggctggaag	cgatgtctgc
95761	agcgtccag	tctagacttt	actcattgcc	tggggggcct	atcccaggca	catcccaggc
95821	ataagccctg	ggagcagggt	gctaggtctc	ctcatttgtc	ctcatgaaga	ggcgtcagat
95881	ctgtcttcta	gatcccttga	gccgccaggc	aaaaacttcc	ccataggaac	agaatagacc
95941	cagaattgag	gccagcagag	ggtctttcct	cctagccgtg	cctgctggaa	tccggcgagc
96001	agggcctgat	ctctttcttg	gccctgtct	tatgtctccc	acatgagggt	ggccactctg
96061	tcacttgcta	actggggctt	gcaagtgcc	caaccccagg	gcaaagggac	tgggccttgg
96121	tctcctcgca	gttttcggga	caaccagctc	agtgaaccag	tgggtctgaa	cattgtggag
96181	gttctccctc	acctaccacg	gctccggaag	cttgagtaag	tgatctttcc	actgcctctg
96241	cagcccagtc	cctctctata	cctgattcac	cccactccct	tgcaaggcaa	ggaaggctctg
96301	gggcccctgg	ggtaggggat	tccactcctg	acacctttgc	cacaatcttg	cagcctgagc
96361	agcaacagca	tctgcgtgtc	aaccctactc	tgcttggcaa	gggtggcagt	cacgtgtcct
96421	accgtcagga	tgcttcaggc	caggtgagca	gaaggaaaagg	gatcttggcc	ttatgggcct
96481	tgagaaaaga	ggaggggaaa	gtgggatggg	aaatggagga	ggccctcgt	ctgcaggata
96541	aatctgtgca	taccctactg	ttttactcac	agctttacct	tcagaacctta	gctcaggctt
96601	ggcacctggt	acttggtata	tattgaatta	atggatggat	gaaaagatgg	atgtatggat
96661	ggatggctga	aaagatggat	gggtggatga	aaagatggat	ggatgaaatg	atggctgaaa
96721	agatggatgg	gtggatgaaa	agatggatgg	atggatggat	ggatggatgg	ctgaaaagat
96781	ggatgggtgg	atgaaaagat	ggatggatgg	atggatggat	ggatgaaaag	atggatgggt
96841	ggatgaaaag	atggatggat	ggatggatgg	atggaaagat	tgatgggtgg	atgaaaagat
96901	gaatggatgg	atggatagat	gaatggatgg	atggatagat	ggctagctga	aaagatggat
96961	aggtgtgtga	aaagatggat	ggatggatgg	atggatggat	ggatggatgg	atggatggat
97021	ggatgaagga	atgagtcaac	aagtctacga	agcacaggca	tagccaaaag	aataattagc
97081	tgtgtgttgc	cctccatggg	gctgaaccac	tatagccagt	tttgatcatg	gggtaggtta
97141	ggtgtcattt	ttcttactca	taaaaatttc	tattaaaaaa	aattcagccg	ggctcagttg
97201	ctcatgcctg	taattccaac	actttggaag	gccaaaggca	gaggattact	tgagctcagg
97261	agttcgagac	caacctgggc	aacatagtct	ctacaaaaaa	tgaacaaaat	taatggggca
97321	tgggtggtgca	tgcctgtggg	tccagctatt	tgggaggctg	aggtgggaag	attgctttag

```

97381 ccgtggaggt tgaggctgca gtgagggtgtg aacacaccac tgcactccag cctgagtagc
97441 agagtggagat ctccatctca aatttataaaa gaaaggaaaa aaaaaaactc acaacattct
97501 taatttttat tatatttctt gtgaaaattg tttttctgac tttttataaac actcttgacag
97561 gattcatcaa gcaaagacat aatcagatatt tcacatgcct gatttataaac acttttgcta
97621 gttccggttat gtttcctgt caattgcaaa atcagcttta tctggatggt tgaacatttg
97681 gggcgaaaaa ggggtgtgct gtggtgggtg atgtgctggt ttccagtctc tgggtttcat
97741 ggcttgggtat ctgatcctgc agggagcgcg acctcatctt ccttctttcc ccgcccacag
97801 agacaactgc agagctacaa aggtaagaag ccaagaggcg gtgggccttg ggccatcctt
97861 agaagcaact tgggctcagg cagttgaggg gaaagggtgac caagagacta ggaagagctg
97921 ggggtatggga attcttctct ctactgctgc actgaggaat gaattactgc ttaggttggc
97981 aaaggattttt aacttctctt agYgtgtcca gaccacatct ggtcccctgt gaaggaaagca
98041 tccccagaag actcagagga aggcaaaccc ttggggagaa cataaagata ctgtagact
98101 ggcatctacta gatgtgaaa actctggaaa agcccttaca actgaaaaaa gacaggagg
98161 gcaattatgg tacctacatc ttaggttgt tctgagaatt aaatgagtta ctacacttaa
98221 ggagtttaga gcactgttg gcactgttg catgcagtgg

```

Following is a genomic nucleotide sequence of a *PROL4* region (SEQ ID NO: 2).

>12:10841901-10975900

```

1      tgaggagctt gaccagccct ttaaaccaac tcagcaagtc tgaatgatgt gcaaagggac
61     aattagatat gggtaagaag tccccaacct caaccataaa aggactgtgt ctgaggttct
121    tacagcatca agggagatgg ataccatggc ttccatcaag gtgctgctag tctgtctctc
181    aaaggctttg gtgacctga gctctgtcga gagcatagat gatggcaaRa ggaggaattg
241    gggacaatac aatggataac ggggttaaaa tgcattgaaa gtactagagt tagattgacc
301    ctttcagaaa ttaagcactt tattttcaga gagtaggtca ataaaaggag aggaaacctt
361    aatttctRtt ttccactgat tgcagatact tctctgaaaa tctcgcccta agtcttaagt
421    caacgtcttc atgatgtaat ttgtccgttc taatgtatat ggattttcag ttgttgattc
481    tgtttgtgtg aatcagggca tctaaattga acggaaaaatc tatatttttc atttctataa
541    tctataatag aattctataa ttctataatt catctagata tcRcatttcc ttgacatcaa
601    actcttgaac atttataaat attgataatt ttgattaaat ttgtacttaa tcaaaatttt
661    gatgctaage aggcactatt aaattctttc tattccattc cttaatcctt taaaatacag
721    gtcacccctc attcagagtc aatgattggg actagggttc tactttggga aactttggtt
781    tattgtatcc aaatctttat aatttttttt ccctaaagct ctcttaggca tttttaaatc
841    tctgtgtctc aaacctaatg gtctttctag aaattcacag ctggggtttt atcaaatcat
901    gttttaaatt tgtcttcttt ttcatttttt tttttctctt aaaatcctaa gtactgttgc
961    tgaagagttc tttcaagagt aaggtaaac tttattcagg gatgtgttct tttctttgtt
1021   cttcagaagc taccatagtt ttcttttttg tttataaac attctcaaaa ttctcaaaa
1081   ttctcaaaa tgagtttagg gagtcccaa gggaaaaaga gaattacaaa atctgaaagt
1141   tttagtgggt ctcaataata acattgattg attgagacaa gcctcctctg tcaccagat
1201   tggagtgcag tggcatgaac acagctcact gcagcctcca cctcctgggc tcaagctatc
1261   ctctacctc accctcctaa gttagctggga ctataggcac acaccatcac acccagctaa
1321   ttttaaaatt ttttatagag atggagtctc accatgttgc ccaggcttgt cttgaactcc
1381   tgggctgaag atatcctccc acctcgctct cctgaagtac tgggactaca ggcattgagcc
1441   accatacttg gcccaataat gttaaatatg gaccatctcc ttcattttca cattagaatc
1501   tcttgtgtca gagttgtaat tagcatttga acatcagcag aatatagaca cagtacttat
1561   ttgtaaatgc ttttctctaa atctttctac aaccaatggc taatgattga ataacacaaa
1621   tctcccattt ttgcaagagc aataactccc ttgacatata actaatttga agcataaaga
1681   tacataaaat ttgcctacat tattgtagtc aatcagtgaa tgtatcattg cactttcttt
1741   tgccactctg aattaaaaca caaatgcttc attctttagt tttcaagtcc tgataactgc
1801   ttaaacacta atttgtcaca gagtaagtga aatttaaagc caccattagt cacacacagt
1861   ttacatgaaa aatttgaagt ccatttctaat ggcctgggga gagactctgt gtaggaggaa
1921   ggatataata catgccaga gtacatgaga gagctaata attatgccac caaagaagtg
1981   gcagaattga gtaagtgagt caaccaacaa tttgtgtgtt caaagaaaac ttttatgctt
2041   aatgattttt ttccccgtgt tctgacttgt caatgacctt tctactgagt ttatgatgtc
2101   atttcaaaact tcattctttt tctcttcttt ctttgaagga ggctttcaag aggaagatga
2161   aaagacctaa ctaccatgtg agctattttt agttcaatta agttatgaag aattgttcta
2221   aatggattca acgaacctct gggttactgt tctaataaaa catttctaca agtttttact
2281   gtaatacaaa taatcatgtt taacctgaa aacttttttt ctctctttat ttacaaatat
2341   tttctttttt gtacacaaag ttctctggct ctctaggctg gttagtacag ggttgatcac
2401   cctaaaatat ctttggccaca ataYgaatga tgtgcttttg atggtatgtc ccagatacat

```

2461	atttcctttt	gtggcctgac	atatggcatt	gtctggagaa	tattcaatat	atgcttgaaa
2521	agagaatgtg	ttgtctcttc	cttttatgga	atctttcata	aatatcagat	cagggttgctt
2581	gatagtgttt	gttaatgtat	tctatatctt	tacagatgtt	ctgttggttca	acaaattact
2641	gaaatagaat	cattgaaccc	tttaaaaaaa	gatgtcttat	atacaatcca	aacaatattt
2701	ctctgggatg	tagagatgat	ctacattgag	gcaatatatc	ctttgagagt	tttgacattt
2761	tagcataacc	atgtattagc	ttttgattga	atgtcttgtc	acagcatctt	gataatcatt
2821	gcctgggtgca	gtccgtggac	atacgtcttt	tgtggagaaa	ttttcttcaa	taaataatta
2881	atagttcaat	ttaggtctct	tattttatag	acattttcta	cataattttt	ctcactttta
2941	cttatagatt	gtccttcatt	cattgatctg	caattctcaa	ataatctttg	aacttactgt
3001	gacaatatat	ttagccataa	tatatacctt	ttctgtgatt	ataagattat	tcatagaatt
3061	ccacagcatt	tattaagaac	tgctacttta	ttgagtcttt	cccaaaagta	gagctttggt
3121	ggatgatcca	agaggaacca	tctaacgcgg	actatgagaa	ggaactagtt	gcttttcata
3181	aagatgcaaa	taacagcaag	atgctgttac	agttgttttg	aattagtcac	acaactttgc
3241	atctggaaac	acggtttaga	actatgaaaa	tgccctctac	tcttgatagt	tgatattagg
3301	atattaattt	ctatttgctc	tgaaacatgt	tttaaaaaac	agcaactcta	aagaaaggaa
3361	gagttacaga	agagagaaac	agggatacac	agacagagtc	agaaacagag	acagagataa
3421	agagatccag	ccagctgtac	ataagattcc	ctacattaca	attacagata	cactaattaa
3481	gttttaggag	taattaatca	cataaaacat	taatgcaaga	actgaagtta	atttagaaac
3541	atcttatctt	tgtttgcct	agaaaagcat	agtttctctt	cagatttggt	tatgtgtgtg
3601	gaattttctt	ccttttagaa	tagaYattac	tttccaaatc	accttttagag	atgcatgtct
3661	taattttattg	ttccccagta	ttaggataaaa	tgaatgactt	gaggggtaKa	ttagagctat
3721	ggactcacca	aaaatcacag	ctaattccgW	ctctggcata	aagttagctgg	agggtggcaat
3781	gagaaaaggac	aaatagtagg	caataaagag	gagaaggaag	gaaatgacag	ctttcagggc
3841	tctcacatgg	gcttctgtgc	tggggtctct	gcacctgtg	gcactgagct	gcattcgccct
3901	gatatgtctc	cgcagggaga	ggatcaagag	gaaaaaggac	attaggcaca	cacaaaaggg
3961	gagcagcgtt	gccaggttga	gaaataactt	ggtagaagca	tgttgagttt	tatttactct
4021	gcaactccaa	gttaagtttg	ttttctctct	tgcttcaca	caaaacctga	aatcagcggt
4081	caaattctca	gtggctggaa	ggctaataaa	cacagagaga	accacgcacc	ccagtagaatt
4141	ccaggaaatc	acctgtgcaa	ttctccactt	catccagagg	aaaagtgggt	gaaagaaatt
4201	acctatcttg	aagaaatagt	aaatgctgag	gcaggttgca	aaccagatac	ttaaatgatt
4261	ggttagtgct	cagaagaagt	caatgattct	catttcttta	ccagtggcat	agacatctgg
4321	atatagcacc	aatataaaac	aatctaatag	tattacgcac	aatagacaaa	ttctggatat
4381	ggccagactt	gtgaggatta	aatcaatgga	ggcaattttc	ctcttcttga	cccagtccat
4441	gcagtttacc	aatccaatga	atgcattccc	taagatcccc	actgaaaact	ctccaactgc
4501	taagaacata	aaagttagct	gcactttatc	tgccatgttt	aaatatgcaa	ttagtttcta
4561	gttgacctga	tggagtttga	catccacacc	tgcttcttag	attttgatgt	agttttcttt
4621	acctctttgt	tgtagtctgt	tttgtgatgg	agactggaat	gataaatgaa	gactggagct
4681	atcttcatat	aatcctaatt	agtcttgaca	aacaatgtgt	ttgScgatcc	ttggcctggc
4741	cactgtatgc	ccatttacct	actcagcagg	ttgtaatttt	Ycacatacgg	ttaatttagg
4801	ctgagctact	gtttactaag	atgcaaattg	ggccaattcc	ctttcatggg	cctgcattgt
4861	ctttctgagg	ctaaggtgta	cgcatttttg	attcattaat	ttgtgatgta	tgctagtaac
4921	ctcaataggg	ttgctagatt	tagcgactaa	aaattcagga	cactcagtta	aacttgaatt
4981	acaggtaaaa	aaatcaataa	tttttttagtg	tatgtccctg	attacttaag	atcagtgcct
5041	tcagggaagta	ctgaagttca	aattagattg	agtgttccat	tctggcaacc	tgaacatcaa
5101	gaattttgga	gcaagtataa	aactggtaaa	attggaaaagt	tcttgaagaa	tttttatttt
5161	gctgaatgtt	aatattgata	attagtaaaag	aatccaaagt	ttggttccat	agtgagagtt
5221	atatattttc	aggaacttta	aaaagttaac	actaaatgta	ggttatttga	ttccaaagaa
5281	actttaggtc	attatttttg	ctgttcagat	gaacaattac	atggcatagt	gtctcttaat
5341	acaacacatt	gtcttactga	ctaaatgact	tttaatgggt	atttagcaat	gttatatata
5401	ataaggtaga	ggacctgtaa	taaaaaaaga	ctattgatta	ccttaaattt	ttcattttca
5461	cttaaaatgt	tctcaaggaa	actttgagag	gtattagata	tgtccattac	cttgtttggt
5521	gtgaagatat	catgggtggt	tgaaatttta	tacattaaat	atatgcggtt	ctttttatac
5581	caattatact	ttcataaaga	tttcaaaaaa	ttaaaaaatg	ttctcaaggg	tagttgtatg
5641	catgagagag	gagatagtaa	aattctgtat	ttcattctct	ccactgtcct	ccatacaaat
5701	tgcatgagta	tctagatcct	caacccttct	agcaggagac	tgaagattaa	actttccaca
5761	tctctagaga	tgaattttta	gtttgaaata	gcttctctaa	tttagagtta	ctgagaagcg
5821	ctttactaca	tggggttcca	tagaatagtt	cttgggtatt	cacaccttcc	tgggaatgca
5881	tgtcttctct	tatccttctt	taaaggacaa	accatcattc	cggagatgta	gccttaactt
5941	ttggacaatc	tgtatgatta	tgtagccatg	ttcacaggca	actggaacat	cacctatgat
6001	aggacgatct	tggatatgat	ccctgacctg	gacttatcat	ttcttttggt	ttttttttga
6061	gatggaattt	cgttcttggt	gctcaggctg	gagtgtctatt	ttggctcacc	gcaacctcca

6121	tctcccaggt	tcaagtgatt	ctcctgcctg	agcctgccaa	Rtagctggga	ttacaggcag
6181	gtgcaacccat	gcctggctaa	ttttgtat	ttagtagatt	ccgggtttct	ccatgttggg
6241	caggctggtc	ttgaaactccc	gacctcaggc	gatccgtgtg	ccttggcctc	ccaaagtctt
6301	gggattacag	gtgtgagcca	ctgtgcctgg	cctagactca	tcatTTTTac	cctacagttt
6361	atcctggtaa	atgaagtgtc	catgggaact	atgatgatgt	attttctcaa	ataattttta
6421	gacttgTTTT	tgTTTTagttt	tgaaaataaa	tgtagatttt	atgaatacca	atgttgtata
6481	gcgtgaagtt	atgtgaatat	atagttaaaa	aaaaagttct	atgagagagc	attttgtcaa
6541	aagcttacta	ctttgaaccc	cagtcactgt	ggtcactaga	gatgcttgaa	acattagaga
6601	ggcaggaaa	aaaatatgga	agaaaaaac	ttaaccctaa	tggggtaaaa	ccttcccaaa
6661	agtactaatt	caataaaacg	tttatttcac	ttaaaccctta	ggaaaaatat	aaagttcatc
6721	ctagtataaa	atctacctgt	attttgtaga	atacattaat	atatttcatc	aagagaacat
6781	gaattcttgt	gtcttgtaaa	acaaagagta	acataacag	ctagcatatt	agaaatatag
6841	ttcataaaat	ttatatactt	ggggctataa	atattagtac	tttacagagt	gagttttaca
6901	taataataag	acaaacaact	gataattttc	cggttaattag	tatttttagtt	ataataaaaag
6961	gaaattagta	gattgaaata	catcagaatt	aaacagaaag	taatgggagt	aaaagcaata
7021	atgtacagcc	atattagtac	atacacaacc	tgagatatgc	cagaccaaac	gtttcaataa
7081	tattatagt	aggatgKatt	tcattgtcac	agaaaaatta	aaaatttttag	tgacttattt
7141	tcctTTTTtt	tttaataaaa	atttatctgt	attttttgta	aacattcgtt	tcttcttcca
7201	gggacagat	gtgcttat	catgggtata	gctattttct	tcccaattta	tttcttttgt
7261	taagtctga	gtgaaaacct	ttgcagggtc	tggttagaga	aaagaacctg	attgagcagt
7321	ctgactaata	tttgttatcc	ccattctttt	atccagattg	tgaagagggc	ttaggaacac
7381	cccttggtgg	gtggcacttg	aatgggttcg	attcccacct	aggtgctgca	tgaaaagcaa
7441	gttgTTTTgag	aggaaattta	attccaagga	aatcaatag	aatcatcag	aataaggtca
7501	accagaaaa	attacctagg	agaccatgga	aatcatcatt	cgggaaaacc	aaagacagac
7561	cagagaacat	ctgagttcct	aatcaataag	ccaaatgggg	gtgactcagc	agagccatga
7621	aaggagcaca	atgaaggagc	ggcaataaaa	atgtatgaca	aagaaaaatg	agaaaccagt
7681	tactgtagct	cagggtccact	ttaccatgag	ccaaagtaaa	atctaaaaag	actttaacta
7741	ggcaatacag	gcctaacact	tcggttgagg	agacaagaag	agaagcatga	gctctgaaat
7801	tcttcgagga	aagggaggtg	aaagatgagc	atttctgagt	tgtaaaagga	tagaaaagat
7861	gtattcagta	gtttgctact	aggctccta	aatattttaaa	gatatgcac	caaaataaat
7921	gagataactg	gggaaaaatg	agaatagact	attaagaaaa	ctatatTTTT	tgtagagaa
7981	gatttggttt	taaaattccat	ttatacagct	aagatttcat	atcaYgcagg	caatttttct
8041	acatgtcagc	attctgacaa	atgtctgcct	cagtttatta	tttaaaacaa	ttaaaataag
8101	tgagtgcacc	aaggggtaga	gaattgtctg	aatctctcca	aactccacag	ctaacttgta
8161	ttttgtcata	agatagctaa	aggtcatcaa	aatagaagaa	atatagtata	ggaaaaaaa
8221	gaagataaat	gaagtcatag	ttttaatggc	tctcacatga	acttctgtgc	tggggtctct
8281	actgccggta	gcataagatt	ttatttgctt	ggtatgtctc	cataaagatc	ttactaaaag
8341	gaaaaatgat	atcagtgaca	caataaatgg	gacaattgca	aacagggttaa	agagagtYaa
8401	gggttcaaag	tatgttat	tactcacatg	gaacatttca	gtaatgtttc	ttttatgttt
8461	ggcaattgca	tgaaacctat	aatcacaact	cagtactatt	gctgctataa	ggctgaccaa
8521	caaggaaaatg	gcaaaagcatc	ccagcaggat	ccagtgcacc	accatatcaa	ttttccactt
8581	cagccagaga	aaaagtggat	gagaggaact	ggctatcttc	agaaaaatga	agacattaag
8641	gcagggtgga	atccacatat	ttaagttagtt	ggcaaatgtc	cagaaggtaa	aaatgactat
8701	ctgttgTTTT	ttttttgtat	aaacatctgg	gttcagtact	attacaatgc	catttacaac
8761	cattacactg	atcaaaacaa	ttctggcgat	aactaaattg	gtaaggatgt	agtcaactgt
8821	ggaaatcttt	ttcttcttaa	tccagtcaat	ccagttgact	agtgcaatgt	atccattccc
8881	caatatctct	agtatgaatt	ctccagttat	taggattata	aagatgttat	ctgcaggact
8941	gaacatgttt	gtagagagaa	caatctgatt	tcaaatatca	ctgtagatga	gctaatttac
9001	aggtgacctg	ttaaagcatg	atagatcaat	tcttcgaatc	atgcaataat	gttttcatct
9061	gctgttat	cgacgttggt	attcttccgg	aagtgttcag	ctctcctctg	aaataggatt
9121	gtctctacac	tcctgaagat	gaaaccaact	aatgagcagc	ttgactagtt	atttatagcc
9181	tggaaaaaatt	ataattatta	tccttttagtg	agtgtacact	gaaatgtttg	gctgaaattg
9241	ctccccatga	aattcaaaga	gattttatat	catgaatttg	caacaggctt	cttgctgtag
9301	ctctatattg	ggatcttcaa	attgagtttt	gaatagggag	tcataaaaaa	agagataaat
9361	gtttaataaaa	aaccacaactg	tgtaataaaa	acttcatttt	catcatgtaa	gttataaata
9421	agccacaaat	cagttctccc	agatgcaaa	aaattttcac	tttggaagta	attagtacaa
9481	ttagattgta	gatatttaac	atttagtcag	aggataataa	ttcttgtctt	catttaaacg
9541	gctaattagg	gaaggatata	atacaaatct	aattagaaat	gacttttttt	taggcaggca
9601	catgataata	tttactaaga	atttgctttc	ttttcaattg	ttcctcagaa	gtgaaatatg
9661	ccaggtaaag	atttgttatc	tttagttttt	ttttaatgtg	acaaataccc	ttgaagacaa
9721	ttcatttcct	gaatcactgt	ctcttgata	ataagcattg	taatctaaaa	ttaagaaaa

9781	ttaaatttta	cattatttcta	gttccaatca	actcctttta	taagatttgt	aatctcacag
9841	tgcatattat	agtcataattt	ctagataggg	caaacacata	aaaaagtaac	tacttgggag
9901	actgaggcag	ggggatcatt	tgaaccggga	ggcagagggt	gcagtgagcc	aagatcgtgc
9961	cactgcactc	caacctgggc	gatacagtga	gactctgtct	caaaataata	ataataattt
10021	ttttttttta	cataccagta	tttccaagga	ataggactaa	ttctactatt	aaattagatt
10081	tatttgtttt	ggggtaaggg	aaagtacaac	ttagcccaaa	atacatttga	atgtaggtaa
10141	tacRaatcac	aataccctag	ggcttcttgt	atttaaatag	ttctacaatg	tatacaacac
10201	atgcaggatt	ttttctattt	cttacatgtg	tgtaatgtgt	aacaggaaaag	cataaactta
10261	ataacttaaa	gaaacctagt	tatctataaa	ctactgctgg	aaacaaaata	gaaaagaaaa
10321	tgatgcagag	ggaaaaaaat	atgtcagaga	tttctgagtt	agaaggctag	agagaacatt
10381	ccaRggaatc	tttgggaaat	gacttctaaa	attgccatca	ccagctagag	tactcatgaa
10441	cacgctgact	actgggaccc	tcaaccttct	ttctcaaggt	ggttctgcta	tacataactg
10501	tgccctctct	ctctgtcaaa	ctttcattct	tgagattata	ctccttttcc	cacatcatat
10561	atcatcttag	atagaatctc	attaaagatt	gtttttctcc	cttcttgatc	aagacaaacc
10621	cttcagaaaa	tggagaggaa	agggcggtga	agataaggac	cggccttcat	ttcaaagtag
10681	agagttgttt	tgcatgattg	attttatagc	aagggttgat	gagttctaaa	atcttttccc
10741	caaagcctgt	ttgcctgaca	ttctctact	cattgagttc	aaggcctttg	ccagattttg
10801	tcagaaaaga	agtagaacct	ctttgtattt	agtcaatgac	ataaaaatgat	gaaatgttag
10861	tgtgggattt	agatgcattt	tttttttctg	caacgacaaa	gaatatacgg	tgcaatgata
10921	acattagatt	atccattaaa	caagacaaaa	gtgtgaagga	acacaaaaca	aatcttcaga
10981	atcatgcagc	atattaatga	cttccaatag	catataagag	aaaatgaatg	caaacaagag
11041	aaggggagaat	gccttttgtt	gatttctttc	atcctttag	tcaggatact	ctttaggggg
11101	ctctatggaa	caaaaRgctt	tcttcttcta	aRgaaacact	tcacaaatct	taacatcttc
11161	agaaaagctt	ccctcaactt	gctattttccc	ataattagaa	tgaatgaatg	gcttgatggg
11221	aaaatgcagc	ttactatgtc	accaatcatc	aacactaatt	ttccctgagg	aatcagagcg
11281	ctagagggtca	taacaagaaa	gactgggtag	tacacgatga	ggaggagcag	aaagatgac
11341	actgccttta	tggccctcat	gtgggcctct	gtactggggt	ctctgaaccc	tgtagcatgc
11401	agtgaatctt	ctttggtgtg	tctaactagg	gagaaaaagta	acaagaaaaa	tgagatcagg
11461	caaaggataa	aggggaacct	cRccccagg	ttcagggtta	actgtttgaa	agtacctgga
11521	attttactca	ctttgaattt	ccaagtaatg	ttttcttcat	gactgacttt	gaaaagggtga
11581	taccacatat	catcattctt	tggaaacacta	ataattaaag	agataagaaa	ggaccccgag
11641	agaatcgcaa	gcattgacctt	gttgatcttt	agcttcagcc	agaagaaaaa	tgggtgcat
11701	atattggcta	tcttgagtaa	atagaagata	ctgaggcaag	aagtaaacca	gagacttgaa
11761	ttattggcaa	atgtccagac	aacattcaca	atgcttacta	gcacgctatt	gccatatgta
11821	cctggaaaga	gcagcataaa	gaagccatct	aatgatatta	cacacagcag	acagattctg
11881	gagatggcca	agctgatcag	gatgatgtca	atcaaggaaa	tatctcttct	tttgagccag
11941	tcaatgcagt	taactagtac	aatgaatcca	tttcccaaaa	tccttatggt	caattcacca
12001	gcaattaaaa	taatatatat	tgccctctatt	gcacttggca	tgccagcaaa	gacttgtgat
12061	ttttgaatat	cactgatgat	gaatttgactt	tcagctgacc	agtgaagaa	aatgtatctg
12121	tctgcctctt	agacctgat	atagttgtct	ttatctctcc	tttttgtag	ctgtgatgca
12181	gatgaagaag	atagccagtc	ctgctctggg	ctagagctgc	ctaaagactt	caatgattgg
12241	ggccagtaat	ttcctttggt	gcagtgatga	ctgaaagcct	ctaggatgca	aatgggaatg
12301	gatctgattt	cttaaatttg	cacactcttt	cttattttta	gctctgtata	ttttggattt
12361	atcaatctga	gctgttgacc	aggaacttca	agaaggatc	aattacttgg	aaaatatggc
12421	tagaatttaa	tttgctggat	gactatccat	ccttgtagt	atattgacat	agttattgct
12481	attacagatt	ctaggtttac	tgtgttagct	tgtgtggcca	gtttgcttgc	ttggttgact
12541	aaagctttaa	acaaattatt	attaacatta	aatgaggctt	aaatggcata	actgggtgaa
12601	tgtagaggaa	agaatctaaa	ggtgtaggaa	gataggagta	ttaaggtgaa	tttatcatat
12661	gcgaacttca	ccttctcccc	attatatgac	ttaagagggc	caaaaggaca	ctccattcac
12721	tagggcattg	agaaatacat	taattaggtta	attcccaata	tcctcaaaaa	gctctgcagt
12781	gtttgtcttc	tcaactgaag	atacaatgag	ggaaataaac	atgacattgt	agtgttgctca
12841	gcaaatgaga	cacggaaaat	tctgggttag	atgttaggg	ttcttagagt	gttcttgctt
12901	tgtacctgaa	tgtagcttcc	atacatagaa	aaaatagtca	aaatactgg	cacttatctt
12961	tagaatggaa	acagatcagc	ctgaacagtg	aggaggacaa	agagcaagaa	agtgtatttt
13021	ttggaactaa	aaagcgtgat	agatatacaa	gactcttcag	tctgaactga	gtgataagaa
13081	tacatgctct	gaattttctt	agctctattt	tttggcagca	ggtgtattat	aaatattagt
13141	atgctaatta	tacacacatt	ggaaacacac	tgtttcattg	ggacatattg	aaacatgtca
13201	ttgggcatag	tagaacatat	ttgaaataat	agaaaaaggg	acacagcaat	acacagttcc
13261	cagaaatatt	attttgaac	taatatataa	ttttaaggca	atattaaata	ttgcttatca
13321	aacaaacaca	acaatacaaa	gtatttaatg	agataatgtg	tcatatgttc	agggttttag
13381	acaaaaataa	gagataaaaa	ttaactctgc	agatttttat	gagaaaagtaa	atagctattg

13441	ttattctatt	cagtgaatt	tggggtttct	ttcatgcttc	tctgtgaatt	ttgtttctga
13501	agaaatatca	gattatacaa	ctcaaaaaata	cacactgtgc	ttgtcatgac	caaagccata
13561	aaacaggtaa	tattcttgaga	aggacttcac	tagagtaaag	aaattgattt	gcatgcaact
13621	gacagacaag	gtcgcacccat	gttcacatct	caggggaatgc	aatatttcat	tattttaatt
13681	aaactttttg	aaagataaaa	ttttgtggag	gggaataaaag	taggttcaag	gttattattt
13741	ggaaatggaa	ctactctggg	atcaatttgt	aatgtccaga	aaagatgaag	atgaaaaat
13801	atcatgtagg	agggtgatta	ataactgaca	tattaaaaat	tcctggtaaa	tccagatata
13861	gaatccaagc	ttgccttctg	aatcatgggc	tttcccacta	cctcacttct	tttccttagc
13921	ctgtgtggaat	actgatcaat	ttaagaaagt	tatgcctata	ttcaaatgta	aacgaaaaata
13981	tgctatagga	tatgaccaga	gttacctaag	ggcctatact	tactaaaatg	ccaccctctt
14041	ttatctttcc	ttgtctataaa	taaaacccaa	atgatctcaa	tttatttgac	accgttgaat
14101	atgttttttt	tgtgtgtatt	gtgtgtgtgt	gtgagtttat	gtgttatttg	ccctttggat
14161	tttatctttg	cattgagaag	ttaaagaggg	atcctagctg	acagacttta	acatctattt
14221	tcattgcaga	aacactttta	tctagaatgt	tagtttattg	attatttctg	tctctactag
14281	aaaacagatg	aaatactggg	aaacttatga	catcatttcc	tgtatgtctt	tctatgagaa
14341	gtgagcaaac	acaaacctac	ttaggcagat	atttcttaaa	tttcattttc	tttcctttgt
14401	ttaaatactt	tttaccattc	tttagaacct	tacatctttt	acaggcatct	gtccttgagt
14461	tatgccactg	attattactg	atcaagagaa	atgactatac	tcttcagatt	tataaatcaa
14521	gaacaggata	ctgcgatact	gtcYtathtt	ctgacaactt	atattttgaa	tagttgtcga
14581	ctttatctcc	taccctattc	taaactcttc	actatatcca	ttgggatccc	tagtaaacca
14641	ttagcagaag	ccatatattc	tcatttgttt	ctctaacagt	tcactttatt	ttcttctatt
14701	gaactcgagg	ttctggaact	tttttgttca	atggactact	ttgccagtct	ggtgcatgct
14761	ataatttcag	aataatgttt	ttaagtgcatt	gaaataaaaa	tatttgaaat	gtataaggaa
14821	tcatatata	tatgcctttt	tcttgcagta	tgaatatata	tgtaatatata	atataggaat
14881	ttatgtgctt	tttaattgac	ataacaaaaa	tatctggcag	ataaagacta	gtggtgaaag
14941	taaatgacaa	taggaggtac	ctgtaacgac	aaaaattttt	ggcttcctga	agtgaaaaaa
15001	ttacagatac	tgctgggtatg	gtatgtgctt	gttacttaca	ttcaagacag	aagaaatact
15061	agacttaagc	taaggattaa	taaaaataag	tatataattt	ggtgcccttc	ccagttcatt
15121	catcactcat	gtccatgaat	cttttcatth	taatactcta	caattaaatc	ctgtggcagc
15181	tgttttctct	ctcacaccct	catagaaagt	ggtctaaagc	tgggatgggt	gtttttcttt
15241	ccctctcgta	actttcagat	tactctactc	tctttctctt	ttcctttttt	tttttttttt
15301	ttttgagaca	aagtttcact	gtgttgctta	ggctgttctt	gaactcctgg	cctctagtga
15361	tcctcctgcc	ttggcctccc	aaaatgttaa	gattacaagt	gtgagtcact	gtgcctggcc
15421	agattattct	ccgtctaatt	cctcacaga	catacagcag	ttcattatct	cctgtcatca
15481	ctctatacaa	aatattacct	ttccttgtca	caatcataag	ccagtcttcc	ttccttgatt
15541	tttgctttct	acctgaaatt	aagtagttaa	atatactaaa	tttcaccacc	attctttttg
15601	ctaaagttcc	cctatctttt	tggttgatga	aataatcttc	tattttttta	aaaaattcat
15661	tcagtaactt	tggttggtgt	atttttctWt	ttttaaaatt	taattatgga	catataatag
15721	ttgtacagat	gtatgggggt	acatgtgaac	ctcatgaaaa	cagagcaata	taaagacccc
15781	tggtgagaag	ggataacatg	aatgagaaat	atgcatgtct	ctttaagaag	aggaacagtc
15841	ttaattaatg	gataactata	tagagtcaat	aatccaagca	taaaacactt	tattataata
15901	gcatattggg	aatagtcttg	tctatttgta	taaaaatggt	gaagaaatag	aatatttggg
15961	atccatggag	acaaataatt	tatttgctaa	ataacaaaat	ttggacaagg	cttgaaatat
16021	atataacagt	taagagcttc	agctctgggt	ccagacagct	ggagtgaag	cttattctca
16081	gttttaatga	ttgtgtgatt	taaaattgtg	tgaatctttt	ctttctccaa	tgtgtaaaac
16141	attgatcata	gtgctatcta	tctcatagaa	atattatact	taaaataaagt	cttgcattta
16201	aaatacttag	aatagtctct	accatatata	ctcaaaaaat	tttaggtact	attattattg
16261	aattttttgg	cattccattc	aataaatcac	gattctctta	tctagtgtgt	ttgctataga
16321	gcctttatta	atgtgtctta	attacaattt	cctatccata	atatttggcc	aaatttcaca
16381	ttttatgatt	gccatagttt	gaatgtttgt	attttcttca	aaattcatgt	ggaaatgtaa
16441	tcctaatgc	aacaatatta	agaggtgggg	ccttttagga	gatgattatg	atgggtttgc
16501	cattatgatg	ggattaaaag	gcctgaaggg	aactaaaatg	gtcttttaac	ctttcccttc
16561	ttctgccaat	aaaagataca	gcattcaagg	ttccatgttg	gaagcagtga	cgaagccctc
16621	accagacacc	aaacctgcca	ctgccttagt	cttggacttt	ctagccttca	gcactatgaa
16681	aaaataaatt	tctgttattt	ataaactacc	tcactctcaga	tactttttat	agcagcaaaa
16741	tggaactaaga	caatgccagt	cacatgaaat	cataaaatat	ggcaacataa	tagttatggt
16801	ttacaatttt	gttttgtttt	ccattactca	ctgaaaatgt	aaacaaactt	aatggactt
16861	agttgttttt	ttccttcata	tgtagtctct	ttctttatct	aatattaatg	cccagtgcat
16921	ctcataaatat	taatggacag	gtgactattt	tgtttctctc	tgcaatggca	taaaataaat
16981	gatttttaaca	gcatttcaac	ttaaacacaa	taaattattt	atttatattt	gacaacacat
17041	ctaaatgttc	aggttaagta	aaaatattct	cagatatata	ggtttcagac	gtttactaaa

17101	catagaactt	ttttcaacat	tttggaggct	acattaacaa	aaactataat	gggggtgagga
17161	gatacctata	tgaatatgtg	gagtaaagtt	tataagaaat	tttgtgaaggc	ttaggatgtc
17221	aaaaaatttt	ttaaaaaataa	gaaaagaaca	tttgtatact	ataaaaaatct	taaaactcca
17281	gttgtaggta	gaagatcaac	acataaaaact	Stgttgtgtt	tctacacacc	agcaatctga
17341	acagtgaata	taaaaggtaa	attaagaaaa	caattccaaa	ataatgaaat	aactaggaa
17401	aaatttcacc	aaagaagcaa	aatacttata	tacaaaaatt	gatgaaacat	tgctgaaaga
17461	cattaaggaa	gacacaagta	agtagaaaga	catcccatgt	tcatggataa	gatgacttga
17521	tactgttaag	atatcaatac	tacccaaagc	aatctaaaga	ttcattaaaa	ttcctatcaa
17581	aaatttctac	agacttcggt	tcagaaagag	gaaaactaat	gctcaaattc	aggtgaaatt
17641	acaagggaat	ccgaataccc	aaaacaatct	ttaaaaagga	gaacaaagtt	ggaaaaactca
17701	catttaatat	ttttatttta	tatatatata	tatacatata	tatatatata	tatatatata
17761	tatacacata	tatatatata	tatatatata	tatatatttt	tttttttttt	tccctgtatg
17821	cctcattaag	Kcttcctctga	gccctgggct	ggcttcttcc	atggaagata	gcagaagaag
17881	caaggcttgt	ccctgttcac	agaagatgct	agccagatca	ggagctgaag	atagcaaaaag
17941	agggagaagt	ccaaccacaca	gtcccaggcc	ctgggtgagta	aggtctgggtg	cgaggagaag
18001	gctgatgata	tggaagggtg	ctccagtcct	gcttcttctg	cttggaatg	gagaatccgg
18061	agaacctggg	ggatgcaaga	tggaagcgt	gctccttgag	aacatccagt	ctcctagaaa
18121	aaatgggtgc	tctcaagggtg	actgaatgaa	ctcaactatg	ccttggttatt	ttaaaaccca
18181	ctgtctgctt	tctgaattga	caatcaagaa	tccatgtgtg	tcttaaacaa	caattgttca
18241	ttgtagttag	accactggg	agaagccttt	tggtcagga	actccatcta	gccacagctg
18301	attgaattag	gggtggatac	ctaaccacaag	tggaaccaat	cttattctgt	gccactgca
18361	atgtaagatg	taaaataggt	atttttgtct	ccttggatca	gtgctgtatc	tttagtgtct
18421	agaattctgc	ctaccacaca	gtaggggcta	catgaatatt	taatgaacaa	atgaatgaat
18481	aaataagttc	ctgtgaggaa	tttggaaatt	tgaccttgga	aacacagaga	atggcagtgtg
18541	tggaactga	gtcacattgg	ctgcataagc	tagaaagaac	accactcct	tcccatgtct
18601	gaggtcttcg	ggctctatctc	agtcatgact	gagtcctgac	tctttctaaa	gatgattgga
18661	ctcctcttaa	cttttaggaca	gatggctcaa	catcctaact	ataaaactcc	ttcctccttt
18721	cctgcttaca	ttcatttctg	ttgcaaccaa	aaacctttta	tgacatgctg	agaaattttg
18781	caccttgaca	tattctgttc	cccaccttag	gagcttctct	aggagtcata	atcactcctg
18841	gctgtacctt	gggctgcatc	cagatctgcc	ccaatgccac	cacccccagc	tctgtgggct
18901	ctggctctaa	gactacaggg	accagagaagc	aggaaagagt	ggcatcatgg	aattccatgt
18961	cctttagggc	agggtggagg	tactatgcct	cttctccatc	caagaccgct	cactacatcc
19021	tgtcctcaga	tatggctctt	gggaccctca	agtcagatac	tcctaatttt	tcatctgctt
19081	ttgctctaca	gacagaaaga	ggagggtgcca	aagaaatcta	cagattcatt	caaatcctta
19141	ttaaaaattc	tcacagactt	tttttttcag	aaacagaaaa	attgatcctc	aaatccataa
19201	gaaattacaa	gaaaccttga	atttccaaaa	caatcttaaa	aatggagaac	aaagttggaa
19261	ggctcacact	taatatttta	aaaattcact	acattacttc	tcagcctttt	ggctaagatc
19321	aagtataaaa	cttactacaa	agctatggta	atcaagactg	tgttttattg	gcataaggat
19381	agacatatag	atcaatgtaa	tggaattgag	agtcttgaag	taagcccata	tatctatgac
19441	taattgattt	tgacaagtgt	gtaaaaattc	attagggcat	aaagagtctt	tttgacaaat
19501	gatgctagga	caattagata	tcacatgca	agagaatgaa	gttggaaccc	taactcacgt
19561	catatacaaa	acttagctca	atatggatca	atgacctaaa	tataacaact	aaaactaaat
19621	acacctagaa	gaaaaatttag	tggtaatctt	tatgaccttg	gatttggcaa	tggtattctta
19681	catatgacat	gaaaaaagta	agccacaaaa	gaaaaaatac	ttaaattgga	cttcacgcaa
19741	aataaaactt	tttgttatca	caagccactc	caagaaagtg	aaaagacgat	gtatagactg
19801	ggagaaaata	tttgcagatc	atatatctgc	gaagggtcta	aaattcagaa	tatgtaaaga
19861	acctctacaa	cccaacaaaa	aatccaattt	taaattgggc	aaaagatctc	aacggacatt
19921	tctccattga	tttacaaatg	tctagttaac	acataaaaag	acgctaagca	tcattagtca
19981	ttggggaaat	gcaaaccaaa	accacagtca	cRtattactt	cacatccact	agaatggcta
20041	tagtaaaaaat	cctggaaaat	aacaagggtg	ggcaaggatg	tggaataatt	ggaactctcg
20101	tacattcttg	gtgggaatgt	acaacgataa	atctactgtg	gaaaacagtt	tggtgactcc
20161	acaagaagct	aagcatagga	attgctgtat	tatccagtaa	tttctactct	agtatacatt
20221	gaaaaacagga	actcaaacag	atacttatgt	gccagtgtat	attgcagcat	aattcacaat
20281	agcccaagg	tagaaatcac	ccaagtgttt	ttcaactgat	gaatatctaa	acaaattgtg
20341	gtgtatacat	acaataaaat	attattcagt	catacaaaaag	aatgatggtc	tgatacatgt
20401	taaaaatattg	gtgagcccta	aaaacatgct	tagtaaaacta	aaccagacat	aaaatgagaa
20461	aatctgtgtg	attctactca	tatgaattgc	ctagactagg	ccaattcata	aagccaaaga
20521	ggagatcaga	ggtcaccagg	aaactgtggga	aaggaaaaat	agggagttaac	tgccataatga
20581	gtccagagtt	tctatctgtg	gtaatgtaaa	agttttggaac	acagaggtga	tgcttgcaaa
20641	acattgtgaa	tgtagttagt	gccacagaat	tgtacactta	aaatggttaa	aatgacaaat
20701	ttgttatata	aatgttatca	caataaaaat	aaaacaaaat	aaatgtgtaa	attaaaaaat

20761	taattattcca	gaccataaaaa	acatgcagca	tggaaatgac	tgtcattaga	taagaacagg
20821	ttaaactttt	aatttttatat	gaaatgaaca	taaagatacc	aatttttaaac	ccagcacatg
20881	aaaatttgat	atcaatagaa	acaggaaaagg	aaaaagatct	gcaataaagc	attaaaaatag
20941	agtaaaaaga	agaaatgaga	agatagaaaa	caatgcaatc	acaattgtat	tgagtgtaaa
21001	aatgttttct	aatagtaatt	ttgagattac	attattaaat	aaagtgtcaa	aaatgaaata
21061	tttgttttct	acaagagaca	tttaaaaaata	aaatgcagaa	gtgttgaaaa	tcagaggtg
21121	gaaaacacac	aatttagaaa	tgataaatgc	ttgaagtgat	ggatcctaaa	tatcttgact
21181	tttattacac	attatataca	tgaaacaaaa	tatcacatat	accttaca	gttgaacaaa
21241	tattatgtat	caaaaataaaa	taaaataaaa	tgtaacaaaa	ttaggaatt	taccaagggt
21301	gaaataaaat	ttaaagcaaa	aattttcatg	gcaaaactttt	ttaatatcag	taaaaataaac
21361	cataaaaaag	taatgaccat	gaataaaaaat	gcaattatca	acattgcttc	aaattaaatg
21421	caactacaaa	taaaataaatt	atgagcataa	agaaataaat	cagtaattgt	aagtgtaggt
21481	ttactaattt	aactatttga	aattgtcata	tattaaagac	gtaaacaagt	aatatcat
21541	atattgttca	tctaattgcat	atacatttaa	ctttaacaca	tcaaaactcat	ttaaagaaaa
21601	tcattcacaa	aaatggatca	tgtattgggc	caaataaatc	ttatcctagg	ccaaatatca
21661	tacacatatg	ctgtctgact	caaataaaat	aagatatcaa	tacaaaagtt	acctttaaaa
21721	atctcattat	tgtaaataat	ctcttgcat	aaaaggaaa	tgtaagaat	atcttgaaat
21781	tatttgaatt	gaatacaata	taagaacat	gtgccaacat	ttgtggaata	catataagtt
21841	gatatttggg	cagaaacat	acaattttga	atccctttac	taaaaaaaaa	aagaaagatt
21901	ggacaaagct	agtgaacaa	acaacttttg	ccttcaaaag	tatggcaaac	cattatccta
21961	agcaaattaa	cacagaaacc	gaaaaccaac	tatcacRtgc	tcttgcttat	aagcgggagc
22021	taaacattgg	ttcacacaga	cgtaaaaatg	ggaacaatag	acactggcga	ctaagtggag
22081	agggagggtg	ggcaggggtc	agggggcaag	gactgtcaaa	ctacctattg	agtacctg
22141	tcactacctg	gggtgatggg	tcaattat	cccaaacctc	agcatcaagg	aatataacct
22201	actaacaac	ctgcacctgt	accccttaat	ctaaaataga	agttaaaatt	atctttataa
22261	attaaaaaaa	tctgtataaa	aatatatgaa	aaaccagatg	tctggaaaaa	tccttccagt
22321	caggaaaaaca	taaagatact	gaaaaagaag	ccttcagaaa	tatttttaaa	gtgtatgggtc
22381	cagctgtcaa	gagagttaaa	aaagaatcct	cagatgccaa	aaatagttag	aaagtgcaaa
22441	tcattgagagg	aaacagtgct	gaagatagag	ttagtcccta	actaactatc	ttggagtgg
22501	atagaggagt	ttatcgagga	gacggcattg	tcactctcct	ttaaaccagt	gtgtaagt
22561	tttttaattt	tgttatgttt	ttaaattgat	gttccgcagt	gaaaagggtat	atgcaaaact
22621	atccctaaag	gctgagggag	ctgagagggc	aaagaaagag	tctaacaatt	ccagttctc
22681	aaaaagaaat	atcttattgat	ttattttataa	tttttacttc	aacaactttt	tggtgtacaag
22741	tgtttttttt	tcacgtggat	gagttatata	gtggtgaatt	ctgagatttt	agtgccacca
22801	tcacttgagt	agtgtaaatt	gtacctaata	tgtagctttt	ttatccctat	cctccctcc
22861	Rgcctcccc	ttttgagtct	ctaaagacca	tgatatcact	ctgtatgtct	ttgtacactc
22921	atagcttagc	tcccgcttat	aactgaaaca	tacagttttg	gttttccagc	catgtgtgtt
22981	acttcactta	gaataatggc	ctccaggtct	atccaagtgt	ctgcaaaaga	tatatatatc
23041	ttatcacat	atatacttat	cttatacata	tatatatctt	atcacatat	atctctata
23101	catatatatc	ttatacatat	atatacacac	acaatctttt	ttaaaagaaa	gcaatattta
23161	ataggaactt	ataaacagag	gcaatgtctt	gggtggccgc	aagatattgg	atccccacag
23221	ccgcccctca	gaaaatatcc	tttatatat	aagctttttg	ggtaaaacat	gtgcagctct
23281	tcataacctca	ggctctcttg	ctaaaactta	tgaccattaa	gaaggttaga	taagcatctt
23341	tatgaggggc	tctctatgtc	acaggaatta	tttaaagaac	ttgctgcaga	acacattggc
23401	atgcaggagt	taaacatcag	tcgttgtggg	agtttcgctt	caggatggca	tcactctttc
23461	tacgcaataR	gctattttcc	tacgttatat	aataattact	gtacacattt	atcaRgtaca
23521	tagtgatggt	ttgaaacata	caatgtatag	tgattcaata	ggttaataag	aagatctatc
23581	atcttaaacg	tttatcattt	ctttgttggg	aatattaaaa	tcctccttcc	tggtatttaa
23641	aactatgtat	tattgttagc	tatagtcac	ctatagtcct	ataaaacact	agaacgtatt
23701	cctcctatct	agctgtattt	tgtatacttt	tacaaacccc	tatccttccc	agcctctggg
23761	atactctgct	cttcttttta	cttctatgag	atcttctttt	tttagtttcc	ttatatgagc
23821	gagaatatgt	ggcgcttaac	tttttgttct	tggtctattt	caRgtaccat	aatgtcttcc
23881	tttccatcca	tggtgtagca	aatgacattt	cattttttta	aaaaaactgt	tatggctaaa
23941	cagtattcca	ttgtgtacat	atacagcatt	ttcttcatcc	attcataaac	cagtgtctat
24001	gttttaaaag	accatatgca	tggttgataa	gatacctggt	ttggacttct	ccaaagttag
24061	aagtgaagatt	ggatactatc	aacaagccaa	gatccctgaa	aggcaaaMcC	ttaataggca
24121	aatgagaaaa	taataataYgt	ccaacaaaag	gctaaagtag	gaatacttaa	cactcagcca
24181	gggcagtgaa	ttgaaagggg	aatgtaaagg	ggaatgaaag	aggaatgttg	ctctaagaat
24241	ttgttataat	agcctttcac	tcatgtatat	ttggggctag	aagtgtgaatt	ctacatagcc
24301	taaatcatta	caaactgaaa	agtttagctt	aaagaagttg	atactggaag	tgatcccagt
24361	cagcctttac	aaagtcaaac	tttttctggc	agacgtcact	gtaaaacctga	tctcaagaa

24421	ttccacaga	taatatctta	ataaaactga	gttcaaaaata	aaatcataaa	acatgtgagg
24481	accaaaccas	tataattgaa	agttagtaca	aacaacaaag	ttagtaatca	gagctacaaa
24541	ggcagcagat	atcagaatta	gagcttctgc	agtctgtgca	aatgctaagg	aagggtcttt
24601	ctctttccct	tgtttctcaa	agcaagtatg	actaaacaga	tattttttca	caggcctcat
24661	cttttattta	attatatattt	tcatatgaca	taaattattg	catagaaaat	tacataatac
24721	tacaagaaaa	taaaaattat	ctataatccc	aatatctaca	ggtaaagaac	ctagacatcc
24781	agtttatgta	taaatctaata	caaaacagat	tttttaagta	acatgcttat	tatctgtcat
24841	ctatctatgt	tgagatctat	tttacaacgt	atgtagaaac	atgttaacaa	tggttagttg
24901	agtactgcaa	atgtgcataa	tcaatttctt	ctttatata	ttttgtgttt	gctaatttta
24961	gatgaaactg	tattttatag	tacaaaatgg	agcttttgat	gaaaggaaca	ggatcagta
25021	aaaataagct	aattattggca	aaaatagcag	aagaaaacat	aaatcaatat	gagatcatgt
25081	aaattaccca	cctattgccc	caaacattac	aaactagtta	cttactaaac	agcaaattaa
25141	gaaaaaatca	taacacatat	atggcatagt	gttaatgtat	aaactagtca	caaaattggg
25201	aagaaaaact	ataagacatg	aaaaaataag	gagaaaacaa	atgaacaatt	cccaaaaagt
25261	atatgctatt	ggtaaatccc	gtagttaatgc	ttaacttcac	tagtaataca	atatatgtga
25321	agtaaagata	tttttgcaat	caaagtatg	acattaaaaa	taataacctg	tttgattttg
25381	agactgcaac	aggacggata	tttttctact	attaacatat	aggtttatta	tatctacaga
25441	gcaatttatc	aattctgcaa	ggaatttatc	aagtttctcc	ccattggaat	tttctttaa
25501	aataatttac	atactgctgt	ctctatatat	tagtcacact	ggaccttag	tttctggact
25561	acctcttact	ccttcttgct	tcaaggcctt	gacatgatgg	tttcccacc	caaatttctc
25621	ctcttttgct	caccatactc	ctacacatta	ttaagatata	aaattaaacc	atcttaacca
25681	cagtgcacatc	ttgtccattc	tcatgaccag	gtcagggtcag	catcctatag	ttttctctc
25741	ccaatatcat	aaatatcatt	gtttaagtta	gctagctatt	catttgtttt	ctattagaat
25801	atattatcca	ttatatgggt	atgttgttca	ctactatata	ctcaatacct	agccaagtta
25861	gcattcaaat	agtattcata	tgaatgaata	gtattcactc	tctataatac	tcatattatg
25921	tttattttcta	aaagtggaaa	actgaagaca	acttaaacgt	aaacgatatg	ataaacacta
25981	agtatatatt	tgtatatattg	caaggggagt	tattatgtac	cccttaaaaa	gattattaca
26041	aataattttt	gaaaacatgg	gaaaatgaa	aaattctaca	taatacaacat	aatctatata
26101	gagaacatag	ttctttatac	aatataattt	caaagttagcc	aacctgggtat	atttggttga
26161	aataggcagc	agcattaggt	tttttttctt	gttatctctt	aactatctgt	acattctaaa
26221	cacaatatgt	taaaaatata	aaaatattga	tttggaacc	tgacatagaa	aattaattaa
26281	gtccttatat	ttggaatat	tccactcatt	aggccataag	tatgagatca	aggcatttcc
26341	ggaagtggcc	aaaataagtc	actgagtta	taacctgggt	tggaacataa	agtttaactt
26401	aaaactcaaa	atttgaaacg	tttctgtgag	tgaagtttg	tgtatatgaa	tgtgtgtgtg
26461	tgcattgttYa	tgtgtgtgtg	tgtatgaagc	ctgaagacag	aacatttcat	atttcacca
26521	gattctatcc	tgtgttcatc	ttgtgtcctt	tggtcaggga	ctgtgttgaa	tcttgagcc
26581	tttggtatcga	tgcttctaga	aaaatcttta	ctcaacttta	atttggttcat	aacctgcctt
26641	atctcaaatc	actgattttg	aagagcatat	ttatttcatc	agtgttttga	tcccatatcc
26701	ctcaactaga	cccttgtttc	cctaactata	tttcacagaa	ctacatctac	tccctgtgact
26761	acttgctaca	catcgtacac	cagtaaaaaa	ggatgttaga	ttctaaaaaa	tgaaaaaaa
26821	acctttaaat	aattaaaaata	gcattctgta	aagaagtacc	accatctatc	ctcacttcca
26881	tgttctaaat	gtcaagattg	atctaatttt	ctttctttct	tttttttctt	ttgggttttc
26941	tgggagaatg	gggtgccttg	cttcagaaaa	gtcaggtaaa	gcacaacaag	aagttttatt
27001	ttagagctta	ttctcaccgt	tataatcttt	acagcgaata	gtctccaggc	tgatggctct
27061	cctctaggaa	gtttgtagga	agaagttgca	gggtggggaa	gctgactaag	ccactgaatt
27121	tgcatgtgag	attaaaaatct	cctcaaagac	tgagattccc	tgaaacatag	tcaaaaacat
27181	tatggaagat	ttcagtgtac	tttaatgaca	cagttaaaaa	gacaatgcaa	gaatgcagtg
27241	caatgaaaca	gatcttcaag	gatttattca	ctggattcct	ttcgtggaac	atccatctct
27301	tcccaagggtg	tctatgtgac	tctgagattt	ttccttttct	cacagcactt	caattgtctg
27361	agtaccctca	aagaggcttg	ctttagcttg	ctgtttccta	gaattaaagt	aaatgagtga
27421	ccccagggat	agatggctgt	ggttgtcatt	ccaaacataa	gcagcagttt	gttttctcgc
27481	acagtaaaac	atgatatttc	tatggccatg	cctataaaaat	acaagataaa	gaggatgatg
27541	aaagataatc	aaactttcat	tgctttcaca	tgagcttctg	tggtggagtc	tctcaatcct
27601	gtcacattcg	attgcatctg	cctgtgtgtg	ctccaaaggg	aaatgattta	aaaaatcat
27661	gtaattaggg	atagtgtaaa	gaagaaaatg	actcccagat	ttagcaaaat	ctgtttaata
27721	aagtattcac	ttttatacat	gttgagatcc	cagactgtgt	cattcttctRt	tttataatca
27781	ttagaatct	tcgcaatgta	tgcaaaaatta	agtaacgatg	aaataagtaa	gaatactatc
27841	atgaagggaa	gaaccatatt	tgttctgtctc	ttcaaccaga	gaaatatgta	gttggaaaaa
27901	tttgctatct	tcaggaaaata	gaagatgctg	aggctgggtg	caaaccacat	acttgattga
27961	ttaccaatta	cccaaaagta	actaatatat	tcaattaggt	taccggaggc	atatatatatt
28021	ggagagaata	tctgtataaa	tccatctgta	attattatcc	atatcagaaa	aattcttgaa

P A T E N T
Docket SEQ-4095-PV

28081	atagctaagc	cggtgagaat	aaagccaatc	gtagataact	tattcttggc	acagtcaatg
28141	cagttttacaa	gtccaataaaa	tccattcccc	aaaaccccaa	acactgactc	actaactaca
28201	acaaaaatga	agatgccttc	cactacacgt	agcatatctg	ctaattctta	atattgcttc
28261	tgttacatct	atcttagatt	acctgctgca	gaatgaggca	tatattggct	gctcgacgga
28321	agtgtgactt	tcttctcttt	cattatataa	agacttgaaa	ttgccccagt	aatggcttga
28381	gatggaatca	gaaatttctt	aatgaagacc	tttccaaata	tgtctacaaa	acatagctag
28441	tctggagaat	gtatgttcag	actgaatgcc	tatctataat	ttgttaaaat	gcaaatgaaa
28501	gtttctgttt	catggatttt	acatgtcctc	ctgagactat	tttgcattta	ataaattgaa
28561	ttgtggagga	ggagtgccaa	acatatacct	atagaatgta	atgcaaaaaca	gaaacaaaaa
28621	ttttgacttt	atctttttaa	atatcaaatc	attatttatg	tcatttataa	tcaatttata
28681	tatgtacaga	aaatactata	tagaaatgaa	aaacaaattt	agccactgta	gatacttact
28741	ctaaatgatc	gatttaattt	ttaattaaaa	tttaagctca	actctaggta	tgacaagttt
28801	cacaaatatg	tcacaaatct	gttgctgttg	ttttataact	atgggtatta	cacccttgaa
28861	tgacagaagat	tatgttgact	acccttgaca	tgaagggtc	ttaggaataa	tctcttcatt
28921	taacacatta	ctgtttgctg	gcacccattc	atttatccaa	caagtattta	ctgaatgtct
28981	agatacaaca	agctctcttt	tgatctttga	gggaatatag	tggtagacag	aatttcaaaa
29041	cttgtgtgat	ttatgttgat	tatatcttaa	tgaggggagt	gggaaacaat	taagtaaatc
29101	aacatactga	tctaagaatt	aaaagtga	ttaaaagtga	aatctaacat	ttattgagct
29161	tttatttat	tcctagcgct	atgttaagta	tctttttctc	atcttaattt	cacaagcctt
29221	caatccttta	aaagaggggc	tatttttgta	tttacattaa	atatgaataa	actaagcttt
29281	ggagaaaaga	agaccttctc	tcacttatcc	tggcatgact	accataaata	aaattgcaca
29341	atgattttcaa	aatgaagtta	aattaagctt	aggaatagac	tacaaatgat	agcaaaaaca
29401	aacaaaccaa	ccaaaagcaa	gtagaaaact	taaattctca	tgggctgcac	atactgaaat
29461	tgacagataa	gaatatgtat	agataaatta	gctaagtgtat	acactgttta	caaaaaacaa
29521	gatgcaattt	cagagaagag	cagcaagaga	ctgttagaaa	gaaattggaa	catttgggga
29581	aaaaacttct	agaaatggag	aatataatta	tataaaatgt	aaatgaacta	aatactccaa
29641	gtaaaaaatt	aatagtaaca	aagaagaatt	taaaactctg	acYgtatact	gcttacaaga
29701	aacacaattt	aaatatagaa	aaggaaaact	ttaaagttaa	attatggaaa	aataagccat
29761	gcaaacatca	tccaaaagaa	atctggcata	attataacaa	tattctataa	agcagacttt
29821	aaggtaagaa	gcagcattag	agaagaaatg	gggagtgtac	tttatagtga	taaaaatgct
29881	caaatctaca	gaaaggtagg	gtaatcccaa	aaatttatga	accaaataat	ctaccaacaa
29941	tttacagaaa	aggaaaaata	agacaaatct	acaatcacaa	tgaaagactg	taaaatcat
30001	aactcaataa	ctcatcttag	aaacaccaa	aatcaataga	tggaaaatac	atgaaaaaac
30061	aattgacaaa	cttgtgttca	acggtaaaat	aattcatatt	cttttcaagt	gcacatagac
30121	tatttttacc	aagactgatc	atgaatccaa	aagaatatct	cacaagtgtt	gaatgttctc
30181	tgaattcaaa	ggaataaaat	gaagttcaat	aataaaaaga	taactagaga	aagaaacaat
30241	ttactaagac	aaaaaacctg	taaatactct	tgagtcaaa	agaaataaac	aaaaattaca
30301	aaaatatttt	taagtaataa	atacaggttg	tgtatccctt	atctgaaatg	tgtgagacca
30361	gagagctttg	gatttcggat	ttttttttct	ttttttttta	gttttggaac	atttgcatca
30421	tactgattaa	gcattctcga	ttcaaaaatt	tgaatccaa	aatgttccaa	tgagcatatc
30481	ctttgagcgt	Matgtcagcg	ctcaagagt	ttcagatttt	ggagcatttc	aaatttcaga
30541	tttttggtat	agggtacttc	aacgtgtaat	aaagaaatga	cctattaaaa	ttacataat
30601	ccaattaaag	ccattctttg	aaggaaaatt	gtagccttga	atgcatcttt	tagaaaggca
30661	gggtaaaaac	agatgaattt	tgtttttcatc	tcaagaagct	agaaagctaa	gagtgaagaa
30721	aaatagaagt	caagaaatta	tagtWacagc	agaaatcacc	gatagaaaag	aattaggtac
30781	agtaatatatac	taatgttgg	caaaagaaaa	tacaaattac	tacagtctct	agagatatca
30841	gaaatatggc	ctgggtgttg	tagctaattgc	ctgtcatttc	agcacttttg	gaggccagg
30901	tgtgagaatc	acttgagtc	aggagtttga	gaccagcctg	ggaaacatag	caagacctta
30961	tctctactaa	aaaaataaaa	taaaataaaa	taatttagca	gggcatgggt	gtgtgcacct
31021	gtagtccag	ctacttgga	ggccgagcag	gaggattgcc	tgagcccagg	agtttgact
31081	tgacagtgagc	tataattggg	ccactgcact	ccagcctggg	tgacagagtg	agacctcatc
31141	tctctctctc	tcttctctctg	tctctctctc	tctctctcta	tacatacata	tatatacata
31201	tatatataata	catatacata	tatatataata	tataatacta	tataatatag	ttacatatcc
31261	ttgtatataa	tcttttatta	taagacaata	ctgtgaacaa	ctttatacaa	aatttcatca
31321	agaatactta	taagactatt	acaggcta	atagcctgaa	catagatgca	aaaattccaa
31381	acaaaataga	gtccagcgat	atataaaaaga	ataattcatt	ataacaaaYg	gagttttaaa
31441	agccaattgt	gagattaaaa	tgaaataatt	gaagatacag	tcaatttaaca	caaaagaaag
31501	ccagaaaaag	gacagagggg	caaaaataag	tgagataaat	gaaaaacatt	gagcaaaatg
31561	caagactttac	agccaaccat	actgataatt	acattaaaca	tgatttgact	aaacactctg
31621	atgaaaagat	agagatcatc	agaatgaata	aatgaaagca	caattaaatg	ttatgcctag
31681	aagataaaaac	attaaacata	aaggcacaga	tagattgaat	gtaaaaggaaa	gaaaaagcta

P A T E N T
Docket SEQ-4095-PV

31741	tactatggaa	tttgtaacca	tagaaagcag	gactgggtSt	attctcaaag	tggctatatt
31801	atcaagacaa	gtagtagaaa	aatagagggg	agttgtataa	tgataaaaata	ttcaatttat
31861	caaaaatact	taacaatcct	gaaggtgtat	cagactaata	attgtgactc	aaaataaata
31921	aagcaaaatt	aacagaacta	aagcaagtga	taggcatagc	aaagatttaa	aaacccttt
31981	gctgtgatct	gcatgtgtct	cctccaaagt	ctatatgttg	aaacttaatt	gccagtgtgc
32041	cagtattaag	agatggttcc	tttaggaggt	aatgagggca	gacctctcat	gaatgagatt
32101	aatgaccatt	ttgatgtgca	ttctaggtat	gttaactcta	catgccttag	attgtgcaat
32161	agtaactggg	ctcttatgaa	agggttttta	caaMttccac	aagttctaga	ctaatttctg
32221	cagttacatc	agcagcaaaa	atattcacaa	aaacaatggg	gccactgcat	ttcagcctgg
32281	gcgacagagt	gagactccat	ctcaaaaaca	acaaaacaaca	acaaaaaac	ataaagttaac
32341	tggctaaatc	catattatta	cagagacaag	attgttacct	agaggaaata	agtggttttc
32401	attctatttt	gcttacttct	gttaaatctc	taacatccac	Yttctgtaga	tctRaatgRg
32461	tggattacaa	cttattcaca	cctctttttt	atataatagg	gattattttc	tctttaaaat
32521	atttttaaaa	ctattttaga	ggtcagtcct	ggcccaggaa	gaattttatt	attttatttt
32581	attttatttt	ttattttatt	attttatttt	ttattttatt	attttatttt	ttttgagaca
32641	gagtcctctc	ctgtcgccca	ggctggaatg	cagtggcgcg	atctcggtc	actgcaagct
32701	acacctcctg	agttcacgcc	attctcctgc	ctcagcctcc	ccagttagctg	gaactatggg
32761	caccgcgccac	cacgcctggc	taattttttg	tatttttagt	agagacgggg	tttcaccgtg
32821	ctagccaggga	tggtctcgat	cttctgacct	cggtatccgc	ccacctcggc	ctcccaaatg
32881	gctgggatta	caggcctgag	cccgcacccg	gccaggccca	ggaagaattt	aatgggtact
32941	tactcagtga	cacaggacat	atacaaaaaa	agagtacgat	gaagcaagaa	agattacacc
33001	aagacttctt	gttgacttct	ctctgaggcc	tacctgtgta	gctaagagtg	cccgctcctt
33061	caggccacat	ttcaggtgcc	agagaatccc	caagaaagtt	ttcttcattt	ggccgtatcc
33121	aaaaatcaca	acatatgagt	gacccaaga	atactgactt	catatcataa	accagatatc
33181	acaaccagtt	tgttctgtag	caaaaaatac	ccctgtaaat	gtcaagaaaa	gggcaaat
33241	ttatagagca	acaagacaaa	aaaggaaaaac	cgttttcttg	gctctgaaat	gggcccgtat
33301	actgggggtt	tgcaatccct	gaaattgaac	ctaattgtgt	tcatgtgtct	tcacgaagaa
33361	aggagtaaca	acaaaaagaa	aatcgaaaga	atagagaaag	aagagagaga	tccaataaag
33421	aagattatta	tattattaac	atttttatta	ttacttacat	tgagtaatcc	agtcatatgt
33481	ctttcatatt	tttttggaac	cgataaccaga	agacatcaaa	agtgtacgtc	aaaggaaaag
33541	tggtaaacag	aaaaggcaga	taccagtggg	agtatgaaag	ctaccttggt	aattctccat
33601	tttagccaaa	agtaaaaagag	ataggagaaa	ttgacgatct	ttaggaaata	aaagacagca
33661	agacaagtag	caaatacaag	gcacaagtgg	ttggccagtc	tccggacaat	ggtaaggata
33721	tggtttcttt	ccctagcatc	agggattttt	taataagaaga	atattgattc	tggctaaggc
33781	caaactagta	agaatgaagc	caaccatgca	taacttctga	tttctcatcc	aggcaatgca
33841	atctgtgagt	ccaatgaatt	aatttcctac	attcctttta	taaatcccct	acctattaca
33901	gtcatgaaaa	cctccaatat	attcaacatg	gctacaaagc	gaaaattctg	atctgcagtt
33961	tggtgtgtga	ctaattttta	gatgacttac	tgataataa	catagatctt	atgtttgatt
34021	gtgcagtggt	tttattttat	catggctttt	cttttttagct	ataaagttta	gcaaactgca
34081	gtaagacagt	gaaatcactc	tctgtaacat	tcattgaaaa	tttctaacta	cctctgctaa
34141	gaatttccag	tcttggtcca	gctgtcagct	acaaactgta	aatttcttta	tagaaagatg
34201	atcacactct	ggggactggt	gtggggtggg	gggaggggga	gggatagcat	cgggagatat
34261	acctaagtct	agatgacgag	ttagtgggtg	cagtgcacca	gcatggcaca	tgtatacata
34321	tgtaactaac	ctgcacaatg	tgccatgtga	ccctaaaact	taaagtataa	tttaaaaaat
34381	taaaataaaa	taaaaaaata	aaaacaaaat	taaaaaaaat	gaaagatgat	tgacaaacca
34441	aattatcatt	tgctaacatg	taaataaaga	cacagactaa	ttttcattgt	tttgaataaa
34501	attagttctc	ctcttccaat	gaagtgtttc	atttgattta	caaacttgaa	gtttgaaaca
34561	gaaacctttc	accacattaa	aattattcaa	catgtaggga	aaaccagcaa	tccttatgct
34621	aattaattat	aatgcagtca	cagtgtagat	tgctacatta	caaagtataa	tacagagctt
34681	gaaattttca	agaaaacttg	tgggcaatat	atgaatctaa	tatgagtatc	ataattatca
34741	ggaaaacttc	ccccaccgct	ccccaccccc	cactataaag	atgcaggcct	ttcaataaat
34801	ctgtcagtag	catttttaaac	acatttttaa	aaatgatgtc	tttcagtga	acataagcac
34861	cccaaactaa	acatggaaaa	agtgaacttc	ttttgtttcc	tcaaaaaaca	gattctagca
34921	ctttgggagg	ctgaggcagg	cggattgctt	gggcccagga	gtttgagacc	agcttgggca
34981	acgtagcaaa	accccgactc	taccaaaaaa	acaaaaatta	gctaggttag	gtgtgttggc
35041	acacgcctct	gatcccgagt	acacaggagg	tgagggtggg	aggatcacct	gagccccagg
35101	aggttgaggc	tgtagtgagc	cacgaaaaaa	aaaatgtttt	ttttgagata	Waagagtctt
35161	caaataatttc	cacagaactt	tgtaaggttt	acattgtctt	gaggggaaaa	tgcttaaaaa
35221	gtcatgaata	tacttaggat	gatctgttat	gtgtatatcc	atatacacag	atataggtac
35281	atataatggc	acataatcat	aaacatatat	atgtatacaa	atacacacag	acacatctat
35341	ttatacacac	attgtactgt	gWtttgcct	ctacttctct	gtatttttagc	ttgtctgggt

```

35401   tttgttactt ggattgcttc tttttttgca ttatttttatt atttttaata aacgcaataa
35461   ttgtacatat ttatgtgata cagtgtgata tgtgaataca tttatacaat gtgtaatgat
35521   caaatcaagg caattagcat atccgtttct caaatattta acatttcttc gtgttgggca
35581   cattcaaaat ttgtttttct agctcttgta aaatatacaa taaattgttS taattgtagt
35641   caccctactg tgctatagaa cactagaact tgttccttct acctggctat acctttgtat
35701   tcattaacca acctttggct atctccctct ccttctctcc ctatcacatc tctagggaacc
35761   attattctgc ttcctacttc tacggaatca accttattag ctccacata tgtgtgaaca
35821   tgtcatgttt gtctttctgt atctggctta tttcacttaa cagatgttct ccagtctcat
35881   ggatgcttcc ataaatgacc aaatttcctt cttttaatgg ctaaatagta tccattcat
35941   tatgtgtata tatcatgttt tctaattccat tcaaattgta atggacactt aggttgattt
36001   catgtctcgg ctattatgaa tgggtgtgca aaacacatgg gagtgcagat atcacttcga
36061   catattgatt tcctttcctt tggatacata cccagtgggt ggattgctga atcatatggt
36121   agtttatatt ttagttttta agaacttcca tctgttctc cataatgact aaactaattt
36181   atatttgtac caacagtgtg taaaacttcc tcctccacat cctcacaagc atttgtgttt
36241   ttttgtcttt ttgaaaatag ccattataac tagaataaaa taatatctca ttgaggtttt
36301   tatttgcatt tctctgatga ttagtatat tgagcacctt tttatatacc tattggccat
36361   ttgtatgtct tcttttgaga gatattcata cagttaattt gccatgttt taacttaatt
36421   atttgtgttt ttgactgagt tccttctata gtctggatat gaattccttg ataaatgaat
36481   agttttcaaa tattttctct tattctagag gttgtatcgt cagtctgtcg attgtatatt
36541   tgtgtatgct tttatcaaat caacataatg taaactaaat gagataaagc taaaatggtc
36601   atcgcttgct taacataaaa tgcattattc atctaatttt attgttacta ttatataata
36661   ctataatttt aattttgcca ttgattatat agttgcaatt ctgatggaaa cagtgaatc
36721   actttctttt aacttatttc aggcagataa tttcatcaat gaggctcaat gatctatcac
36781   caaacataat aaaagaagtt ggattaaatg aaagggatgt gtgctgagtt atttgtgtc
36841   ttcatttttg agagaattac caatcaattc aggtgtgttt atgaggattt agatttctt
36901   atattcatgt aacaccgaag gttcctcagS acacagagag aagcctgttt cagtttgctg
36961   ttccataaaa tcagaaaaaa atgaatgact gaatagatag aaaaatgcta actcaagagc
37021   aaaaatctgt gccacaatgc tatctagatt aaaataattt cgctttataa tcgtattgct
37081   caaatagtat ataataaaga ggagcaggaa tgaaattata gatattaggg gatgtcaaac
37141   ttatccttgc attcttattg tacaaaaatt cctcagttta catttaagcc cacatgtaaa
37201   attacagcag aatattctgg aaattgcccc acaggtgaga ataaaaatcta tcagggagag
37261   ttccagcgc ctgatccaat caatgcagtg aaccagcacc ataactctac tctctgaaat
37321   cccattatg aaatctatag cagaaatcat tgtaagcata ttctcaaca tgtttgccat
37381   gcttgattat gggatctctg ctttctgtac accactgatt tataaataag atgttataaa
37441   tttgtgtatc caaagcttta gtgttcaata tgtttcttta tcctgtgctR tgattgaca
37501   ctggaaaaaga atggaatgcc tccagtgtgc tcccagacaa agtcctagtt gtctttgaaa
37561   aacgaaaact accttattt ttctcagaat ttcagctagt gattttcaag gcagatatta
37621   tattacctgc tgttgtgaca ctgtttataa tttccttgta aagctatcaa ctaggatttg
37681   aattctgatt tgttaaaata caaatagag attttaaaat attttttgca tcttttttc
37741   cttaagattt aaatgttttt tattcattca ccttagttat aagctagaaa cattaaaaa
37801   tgggtgtctc atggatctcc tgagaagcaa ggcagtcatt gggataaatg cctatatgag
37861   aaagcaagga gagagcgaaa ggtgaacaga gctattgtac taggatataa ctttgacccc
37921   tgtgaaggag agagagaggg aaagaaggaa ggtccttaggc agcagtgagc tcttgagaa
37981   atttcaagat gtccagtagg gagttatcaa gcccaagtg caaattagag gagtctgag
38041   tctcccagga gcaggcctga ccattgaatc tgccccctc tctgtctttg gctgaaagcg
38101   gctcatggaa gtgaatggg tgatagattt catagcatag gtgcatgct tgttagctgt
38161   tggggaaaata cgattaaaaa caaagtctcc tcccaacca gaaagtctc ccacaaatgt
38221   aatagagaaa gaaaatagtt ttcttattaa ataaatatta aaccagaatc tgatatatat
38281   tacaggcaac ctactaagag actgcaaaga cagaaagaga tctcaccctg ttttatatat
38341   ccaatatatg catatgaccc aatatatata ttttctcaag ttaagtgata actaatcccc
38401   aagagagagg acttggcagc attattttatt aYgcatagtt tatcttaaat ttacctggaa
38461   attgggggtg ccactctgtg tagttaacag actttaaaca aaggacaaat aaacacagat
38521   ctttatgtag gagatagtct tgccatttgg agcctgggtg ccattgaagt taggctcctg
38581   tccccagcag aaactgagag ataagggtgc ttatttgtaa aagagatgat taagctctt
38641   tatttttagt gtgtatttgc cttctgtcag ctaattgtgc tccctcaRga cagagatttc
38701   agagggacat tcctatcaca tgccacaaat gtctaaaaatg acagtttatc ttcttactca
38761   cctcgccaat acatattatg tataaagtac ccaaggttta agtaaataca caaaatctgc
38821   tttctgatac tatatcagga tcgcttagag tctgtggcag ttttgaaaca tggctgcaaa
38881   ctctttgatc ctcttctctt tgaggcctag ggtctgcaga ccttctctt aaaactgagt
38941   gggcttgtaa ctgctttaa caatgacgtg tggtggaac gacatcatat actttctaag
39001   gctatcaaga aaaactgtat ggcttttccg ttactcactg gaaagtttcc tcttacaatc

```

39061	ctgaaccact	tcataagaag	tctgacaaa	ttgagaccag	catgctgtga	ggaagctcaa
39121	gccacacgag	gaggccacat	gtaggcaata	tagtcaacca	tttcaaatga	gcccgtactt
39181	ctgatcatcc	aagtcacagt	atagacatga	gagtaaaggt	ctgcttggtt	attgcagccc
39241	ctgccacttg	agtcatagtc	cgctgtctac	atattcctaag	gtgaagggtc	agacattttg
39301	aagaagagac	aagccttctc	atagtgcctt	gtctgaatta	ctgaccacca	gaatctggaa
39361	gcataataaa	gtactgttgt	tttacacca	ctagggccta	ttggggtggg	ggttggggga
39421	ggaggaacat	caggaagaat	agctagtaga	tggtgggctt	aatacctagg	tgatgggctg
39481	atctgtgcat	cagaccacca	tggcacatgt	ttaccaatgt	aacYgcacat	tctgcacatg
39541	tacttcagaa	cttaaaagtt	gaagaaaaaa	tacacaaaat	aaaataaaaat	aaaatattgt
39601	tgttttgtat	ctctgagttt	tggaactcagg	gtgttttaaa	gatcaatgca	taactaaaaat
39661	agaattatatt	agcacataca	taaggaaagt	cttttactag	cttagttttt	attttcttag
39721	catcattatt	tatagtagcc	aaaagataga	aaaaaaccca	aatgttcac	aatgaataaa
39781	taaaatagaca	aaagtggtt	tagtcatgta	atcaaatatt	atttaactat	taaagggaat
39841	aaagtactga	tacgtacaac	atgtatgagt	cttgaaatta	tgctaagtaa	aagaaaccaa
39901	tcacaaaaga	tcccatatta	tataatgcca	ttcagtcgaa	agtcacagaat	aggaaaatat
39961	acagatgcag	gaagaagatt	aatagatgct	taggctgggg	tgggggagaaa	gggtgggatga
40021	tggggggaata	gggaggtgat	atctaattgga	tatgggggtt	ctttttgaa	tgataaaaatg
40081	ttctacaatt	gacagtgggtg	atgggtgcac	atgtctgtgg	aatatattaa	aatcatttta
40141	attgaacact	aaatgagtga	attgtatatt	atgtgaacta	tatctcaatt	aaagcattta
40201	aggcaaaaac	aagttacata	tgacattttt	ccttatagaa	tatgtaacat	ctgtgtatat
40261	tttccataat	tttattatac	cttgtagtaa	cactattagc	tcagtcacat	ttaattctgg
40321	tgagggtataa	ataaaaatacc	aaaagcttta	catcatttca	cttttgttga	ctattactta
40381	ttgagaaact	ttttactcct	tggtatgagac	atgataggat	aggctatgct	gtagcatcta
40441	caatgttaagt	ttcatgaaag	gttcatttct	cggttcacat	tacatgacta	attgaattta
40501	aaaatgcaga	gtgaggtgag	gatagttttc	atgtagtctc	tcaggaatac	aagctagtgg
40561	agtatcctaac	actaaacatg	tgtctttcaa	gtccctcact	taggaagaaa	agagacacga
40621	agagccttct	tttaccatag	aatattcaac	tgttccaaaa	tgattagtgt	aaaagataat
40681	cctaactcttt	ttttttcagt	ctttaagtgc	tcttttcttt	tattctcagc	cccctttatt
40741	gttattatta	ttttcatttc	attattatta	tactttaagt	tctagggtac	atgtgcacaa
40801	cggtcagggt	tgttacatat	gtatacatgt	gccatgtttg	tggtgtgcac	ccattaaactc
40861	gtcagatttt	atgtttcttt	atcctggctt	gataaaaccc	attgtctcag	gacttttctt
40921	ctaaatagaa	aagtagtctg	aaggctcgct	ctgattcatt	ttaagactgt	agtatttctc
40981	ttctgccagt	taatatgttt	tcactttttc	tattttcttt	ttatatccaa	tacatttcag
41041	tatgaaattt	tgtgatgggc	cactagtctg	atgtgcacaa	tttagccagg	aataaatatt
41101	agtggaattca	aaataggcac	tcaaacatc	tgccagatt	ttttaagtgt	tgttggtttt
41161	tttctttctt	tttttttttt	tttcaaat	caactgatga	atgaaagtag	ctgcctagag
41221	aataatgagg	tggtgtccaa	acctgggttc	attgaaggcg	ttatagcacc	tggtgccatgc
41281	tataacttag	ataagtgacc	ttatcctaag	ccatggcttc	aaatgccact	gaaactgggtg
41341	aatttatctt	ttaggaaatg	aagggtctata	gagatatttg	atgaaagaaa	actaagagga
41401	tttgtcacca	gaacatctac	ctttttaaag	ggggctaaag	aaaattctct	agccaagaaa
41461	aataaaaaag	aaagtttcaa	acaaaaagat	taaagaaaac	acaatggaaa	ggaagaatga
41521	ataaattcat	cttccttttc	ttcttcagtt	tggtaaatgt	atttgacagt	tgaagttacM
41581	attatgacat	tatcagctgt	gattgttaac	ttgatttcag	taacatttga	agccatgggc
41641	ttagacaagg	tcacttagga	atagtgtaga	tatcaggaca	agtaagacct	ctgagacagc
41701	catgtgggaa	ctcgacatag	caagcaagcg	atggggagcc	ccaccagtg	actgtcttca
41761	ctctagcagc	tctcagtga	ggcttctgta	ttaggccatt	cttgtgttgc	cataaagaaa
41821	tagaggggccc	ctgcattggtg	gtcacacac	gtaatcccag	cactttgaga	ggcagaggcg
41881	ggcggatcac	gaagtccagg	gattgagacc	atcctggcca	acacggtgaa	accctgtctc
41941	tactaaaaat	acaaaaaatt	agccgggctg	gggtggcggt	gcctgtagtc	ccacctactc
42001	agcaggcaga	ggcaggagaa	tcacttgaag	ccgggaggtg	gaggttgag	tgagccaaga
42061	tcgcgccact	gcactccagc	ctgatgacag	agcgagactc	catctcaaaa	aaaataaaaa
42121	aataaaaaat	aaaggttaatt	aataaaaag	atttaattag	ctcatagttc	tgagggtgtg
42181	acaggcatgg	cactagtatc	tgattagctt	ctgatgagc	ctctggaagc	ttacaatcat
42241	ggcgaaggcc	aaagggggag	gaggcgtgtc	acatgggtgag	agtgggagca	agtagaggag
42301	gcgccacaca	cattcaaaaca	accagatctt	gcatgaactc	agagcaagaa	ctcactaatc
42361	accgagagaa	tggtgttaaa	ccaggatgtg	ccaatctttt	ggctcccta	ggccacggcg
42421	gaagaaaaag	aattgtcttg	ggccatacaa	aaaaatatac	taacgatggg	tgatgagcta
42481	aaacaaaattg	ccaaaaaact	caatgtttta	agaaagttaa	tgaatttgta	Ytgggtcata
42541	ttcaaaagcca	ttctgggctg	catgcagaat	gctggccatg	tggtggacaa	gcttctgcta
42601	caccattcat	gaggaaatctg	ccccatgatc	caatcacctc	ctaccagggtg	ctatcacaac
42661	atcgRgaatc	acatttcaac	atgaggtttt	caggggacaa	acatccaaac	catatcagct


```

42721   tcctctgtgcc aagcatggat ggagctgaga gctttatatg ggttacttac aaaatataca
42781   tgtttttatc aataatatta atagtacaaa ataattactt tgtacccaaa attaatgtga
42841   caaaatatta aaatatatta cataacattt gtacaatgta tataaaaaa taaatatccc
42901   ataaaaattg ataataagcat atgctatttt atttctataa tatagacact cttcaatact
42961   cagcaacttt gttcacatta gaccactttt atttgtaatt attgatatgt tgggtcacaa
43021   acctgccatt ttactttRtg atttctgctt atccgttttt ttttctttt ttgtaattgt
43081   tgttttgtac gccttgcttt catgtgtgtt actttaattt tcttttttta gaattccatt
43141   gaggtttatc tgtggtattt ttgagtatat ctctgtgtgc agacatctta gtggatgctg
43201   taggttttac agcacatgta ataacttatc atggtttaat agggtcacaaa ttttagtact
43261   ttgaaagatg tacggaaacc ttattccctg attccctata tgtctcttta ccctcctctg
43321   ttcccttata agttgtctta aatatttacc tatatacact taaaatcgca tctgataatg
43381   tcataaattt aacttcagct gtcaaaaaa tttaccaaac tgaagaggaa aaggaagatg
43441   aagtttattc ttttttccct ttccattgtg ttttctttaa ttttgggtgt ttaaagtctc
43501   ttttttaatc ttttttcttt tttttttccc tggatagaga attttcttga gccccttttt
43561   aaaaggtaga ccttctgggtg acaaatccctc tcagctttct ttcatcaaat gtctttatag
43621   cccttccatt cctaaaagac aaatatacca gatataaaaa ccagaattga aagttatttt
43681   atttcatcac atagacagtg ttgtgccact ttctatggc tttcatctat tctgatgtt
43741   tctgtcttcc atttgatttg ttttctctcc tatagatgag ctatttcttc tagctgcttt
43801   caaaatttgt tctttctttt aattttcaga tattttacca tggatatacct tagttggat
43861   tctttgtgtt tgtcttggtt agttttatgc actgaaagt tgtgtcccct caaaattcat
43921   atgtagacat cctaaattca atgtgatgtt atttgagggt taggcctttg ggaggttaatt
43981   agggtttagt taagtcatga ggggtggggcc ctcatgttga gatcagaggc cttataaaaa
44041   aaaaaaagag agagagagag ggagaaggag acaagagata tctttttctt ttctccaaca
44101   tgtgaggata caatgagatg atgtccatct atagccaaaa aatgtcttca gcagaactca
44161   tctgtgctgg cattctgac acRgtcttcc agcctccagt attgtgagca acacattttt
44221   gtttttataa accaccatt ctatggtatt ctgatacagt agcctaaaaat ggctaagaga
44281   ttttgggttt gcttgaattt aggaatctgt ggggttttgc ctattgccaa attaaggaag
44341   ttttcagctt ttgagacctt tctcaaaagt gccattttc tctctccttc tgggactctg
44401   ataacacaaa aattaggcct tcagttataa tactacaggt ccctgaggct gtgtttatag
44461   ttttttctct cttacccttca tgaatttttt atgtggttat tgtaagtttc agttctaaaa
44521   tgtccattca gttctttcat atattttaat tttttggctg agataatttt taaatttgtt
44581   tcatatatgt ttgtaagcaa tatactggaa gcatttttat gatgactgct taaaaatatt
44641   ttctgaataa ttccaacatc ttgttcattt ttgttctgga atcttctaatt taccttttac
44701   attcaagttg agatttttcc tggttctttg tataccaaat gatttctaaa tgaaccagga
44761   catttttagc attatgagac tctagaactt atttaccttt tctgtcttag ctagcttctc
44821   cagacactac tccagcaagg caagggagtg agggaggagc actgcattac tggcagggtga
44881   tgatagaaat aaaggtttcc tctcaatctc tgttgacacc taggcaggcg gaggttctct
44941   attactgctg gctggagggt ggattctggg tcaccactgc gcctccactg atagcctgtc
45001   tcggagggaag aagtgacttg ttactgtttc ccacatggcc tccaacagca ccactggta
45061   tggaaaggag ggtgcttctt cattgctgct tttagatgag atccagctcc ccatttgctc
45121   tccagtcata tcaaggtgtg gaaggagagt gaggggctta ttaccacaag ttggggatga
45181   aagttccaac ttctgctatt ctgagatact attctggagg agggttggga caccctgtca
45241   cagcctggct ggtatgaaga tctaaagatc taagctcttc acttgaggta atagtgtttt
45301   ctgtggtact tgactacagt agagtgggta ttgtcgaaat gtttctgcc ttggtagact
45361   atttcttga cctttgccta aaataatagg cttttgttgg gaaattctca tatgtgcctg
45421   ttagtatttc tatgttgatg gcattttcag ctaaaagtct gcaaattata aagcagaaaa
45481   gaaaacttag aggattcatc actatacaat ttattaagtc cctaccacat ctgccttggg
45541   ctctccagggt ctgagttttc atatatttta tatataatgt tcaggggtta tagtttttct
45601   tagtagaagg aatagggcaa aatacattta ctccattttt ctggaagcag aaattgggtt
45661   actttctgta agaaagcagt tgggtaattt ctgtctaaat tctctgcctt tccaagagga
45721   actgggcttt acttctcaga taacaactga gcaacgatag acctacaggt ggcattactc
45781   tctgtatagg tagagaatag gctgaatatt aaatgttaag gagcagaatc attggaattt
45841   aaatgaggaa ggagacttag tttttattca cgtaaaccag ccacctgatg acatgcaaca
45901   gtgcgtttgt tcatcaacat accttttaga tggcctttct gcttctttt tgaatggctt
45961   taatgctaaa gaaagcaagt gtttatcaaa taatctattt ttagataat tcattattag
46021   aagttaattc attattagaa agataattta ttattagaag gtaattcatt attagaagaa
46081   acaaaacgag tcttttttaa taaaagaata aataaattta aatgtattga acttttattg
46141   ttgtatgtca tgtagggtaa ttttgtatac atgttgcat ttacaagact taaatcggtg
46201   aattttatat acatcttgta gggtaatttt atatacattt tataaggtaa ttttatatat
46261   attatgcatt Waattcttgt aagtagccct ctgccttagc cagttcgagc tgcatttaac
46321   aaaatatctt atcttgggta atttataaat aatataaagt gatttgtcat agctctggag

```

46381	gctggaaagt	tgaagattga	gatgggtacca	gatttggggg	tgagtggagag	cccattccaa
46441	acagacaatt	tctcctggct	tctcctctcat	gaggcagaag	tatgaaagaa	acatgaacat
46501	tgagtcacct	catgtcaaaa	gagatggaaac	agctcagcag	ccttggggag	cttctttttg
46561	tagggaaatt	gatcccatcc	atgaaagcag	agtcacacag	acttagtcac	ttcccccaaa
46621	gactccatct	cttaatacta	ttgcataggg	aattaaagttt	caacataaat	ttattttgta
46681	gagacataaa	cattcaaaact	atagcattct	gtccctgggc	atcccccgaa	atatatgggc
46741	ttctcacata	ctaagtacat	ttatttctatc	tcccaaattcc	caaagtctta	actcattcca
46801	gcacccactt	taaaatctaa	atccaaagtc	ttatctaaat	atcatcaaaa	tcagatatgg
46861	tgtaggcaat	tttctaataat	tgaaccatct	ttaacatcct	catcctcttt	caacgtgggt
46921	tattattctt	ttagcatact	gttcgtttgt	ttatgtacta	ttgaatagtt	ttccctaacag
46981	agtatccttg	ctgtcctata	tattttgttt	aatgaaactc	agaatgaatt	cagaaacttg
47041	ttgtttcctg	tacttaaaaa	atctaaaaaa	gaattatgtg	ctttttaatg	ataaagatta
47101	gatattaaaa	ttttctgtat	tcagcgacat	tgagggtgat	aatgagagg	agctggagac
47161	agttacatat	caaattcttt	tgcttcttag	gggtattttc	tattcaactt	tgctcagca
47221	acttgagtta	aatttggtag	tctatattat	ctgacaataa	tactgatatt	gctggaattt
47281	ttacaatcag	aacagagttt	tactcaaat	tcttgcctt	taaagtacat	tatgctgcac
47341	cctttatgaa	atccactcaa	gtttttaaaa	agaatgggtg	acgacttagg	gaggaagaga
47401	gctgagcaat	gaaaaaagag	gagaaaaagag	catagtgaat	tttatagaga	agagatctag
47461	aactacattt	atgcccctag	aaaccaggat	taatagtttt	ggaaatttta	agaattcccc
47521	agcacttgca	actccctctc	atttgttata	tattccttgt	tttcttagag	ttacaagaat
47581	atcaatgaaa	gatgtaaaaa	taattttaag	aatttgcatt	tgtgctatgc	aatctaggac
47641	agaaggggaa	caatggaact	ctttctcctt	ggcagctggc	tttattaaga	taaaggagga
47701	gggaagcctg	ctggaagcat	caatgagcaa	gagtcaccga	tattcttaga	ttgtattaat
47761	ggccctcaaa	ttctgactc	agaaacaccc	acaaagagaa	gcaacaatca	gaaattgcat
47821	gctattaata	ttttattggt	atactgaaga	aagagttatg	accacattat	ttcaatgtca
47881	tggtcttctg	aagggaagtta	tcttcttatt	tattttctga	aacaaaaaaa	aaaaccaagg
47941	aaattttatac	acaacataca	acatggcaca	acttatctaa	ttccttgatg	atattactga
48001	agtaaatatt	tgctttcaag	attaagaaaa	cagatttttt	tatggtgttt	atgttttggg
48061	tactgttcaa	aacattcaag	gttatattta	tgaatgatgc	tgcaacttga	acctgtagta
48121	gtgaaaaact	aatacaagcc	tacatatcaa	ttaacagtgg	ttgactgagg	aatcatgggt
48181	acagtcacac	aagagaatag	tatacaattg	taacaacaaa	agaaaaatgt	acaaataaat
48241	caccaagaag	atctataggt	ctccgtgaaa	tgataaagtt	gtctaagaca	tgtattattt
48301	gaaataagca	aatacagatc	tgcatataaa	ataatatgtc	atttgtggga	aaaataatga
48361	cgtatgctta	tatacatata	aatattttcca	ggaggatggt	caaaaaatta	aggggtgtga
48421	cttttggtga	aggggtgtgg	taagtaggat	aaggcgtcac	tttaagattt	agcttcatac
48481	cattctgttc	agtttagattt	ttttttcctt	gagcatgtac	taatttcaaa	ataagtattt
48541	taaaaattaa	ataagatata	agagcatcaa	gttcaagtat	catttagcag	ggacactgga
48601	cctgagaggg	tagtgtgagg	caggactgag	caaagagtc	tctggcggaa	acctgagaga
48661	aacctgagat	ggagagtcct	tggttttgag	aaggcagact	caaaagacag	aggcagagca
48721	ccaaagggag	agcacacccc	acttctctat	taccaactca	ttttaatgag	acaagtcac
48781	ttaaagaaaa	agttggggag	gtcagtattt	caaaagataa	gaattctttg	aaccacttgt
48841	taaaaataca	aggacttgca	accttatcca	agaatatctg	aatacaaatc	tttagaaatg
48901	gggtccagga	ttatgtaatt	tcaacatatt	tccaattgat	ttgtgaacac	gataaagtgt
48961	gggaatggta	gcagtttggg	catttaattg	agaatgaact	ggaatcatac	ctgccactga
49021	attctagatt	accagagtg	ttgctcctgg	ggatgtcttg	ctggtctgtc	cctcYggag
49081	aatgatgatg	cttctgag	gctgacagaa	ggaaatcggg	gtagagagag	tgacggtgt
49141	cctcgtYggg	gtggtcgttg	ctgattttga	aaaggaggtS	ggggagggatg	gcggtgatgg
49201	cctcctgggt	ttggtgggtc	ctgctgagga	ccatcatctt	ggttaccact	atcaccaggg
49261	ggtctaggta	ggagtccttc	aggaggaggt	ctctgggggc	cctgatctgg	tctctgactt
49321	gagtcctcta	catctgtgtg	agtaattaat	ggacaagaat	gcatgagctc	agtgaagaaa
49381	aactctcttc	tctttatact	tctctcacct	taccacacag	ccctgttctc	cccaaacctg
49441	ctgcttgact	gtcaacttct	tttgtgccca	ctgttttttt	tttcttttta	tgacgtcttc
49501	aacttaattcc	atgtaagagt	gatattggaa	gtctcattta	tttgcctctg	tgacaagtat
49561	gtttccttaa	atgaaaagag	gggttcttgc	atatcttaga	gttgccagag	gatgtctcca
49621	aggacagaaa	aaaaaaaaaa	agcaaaaagca	ttatagcttt	cagttatggt	actggttatt
49681	ttttattttt	attttttggg	tgctgtaatg	acttacaac	tgtagactcca	tctctgggca
49741	cctaagccct	atgtgaaac	tagagctgat	ttcccaggct	cctggaacca	agttagagaaa
49801	tactaagaga	cagaagagaa	agacaatgtg	aaagcctgca	catgatcact	aaacagctgt
49861	ggcaactatt	tatcatctgt	agtgcacacag	ctgagtggtg	caacacagag	aaaagacatt
49921	catgcagtga	tttttttggg	ttgttttggg	ttactcctg	aagccacata	accgtgcggg
49981	ggaacactgg	gggaagaaa	aagcagttaa	ggatggagga	gtcagaatga	gaacacttct

50041	catttggttca	tcatctctca	gcagtcattc	cagcctggga	aaaaagcctg	cccactccta
50101	ttgtcctcaa	agccaggcat	ctctgtattc	aagttgggtg	cctggctcat	ggtccccaga
50161	atcaaagatg	ggtaagaatt	gcctatatat	ttaggggcac	taatattaat	caatgcctga
50221	ccctctttac	cacctcctcc	caaaaaaatg	atgagaagaa	gacactgaag	gaaactaaaa
50281	agaaattcta	gtggaaaaag	Raagaaaaa	attggattga	ggatcattgg	gatttacctg
50341	gtatgggtgaa	agtaaagtct	tcatagttca	catctaggaa	aagaagcaca	ggatgaagtg
50401	aacattacct	cataaatctt	tcagggctca	tagtgggtcta	tagggaaagg	ggtcttctg
50461	ccacaccctg	tgcatccctt	aagttacctc	atcaaccatg	ttctgtgaag	ctgctggaag
50521	gggaggaaga	tgtaggggga	ggcaggattg	ttactatcgc	tgagcatcaa	ccacgaattc
50581	aatagaagag	tcctcttttg	tcatccttag	gatccctcaa	accctaagtc	taatttaggc
50641	acacttctct	gggtattttc	atgtcatatt	ttagatcttt	accttcttcc	ttctttaaat
50701	attttgatca	tattcacaag	cttgcccaag	aggagcaacc	aggagtaaat	atttggatat
50761	aatctttacac	atRctgctcg	caacatatg	aaattttaaa	tgtgattgga	agaaaaatgg
50821	gaatttgggg	acctgatatt	tctataccac	tatgtagaaa	gacacaaatg	tattatccag
50881	tcctctatgt	ctgacagtac	tctgatgttt	gtttatctct	ttcattgatt	ctgcatcccc
50941	tgtacagcaa	ggacaccatc	atcgctgtcc	actgagatta	ctgtagcatc	ttcatagctg
51001	gacttccctg	gatcagtcct	gcattctcca	ctgcatcctt	cacagcacag	ccaggtcttt
51061	ctaaaaatac	aaatcttact	ttgtcattcc	tctaattgaa	attctctatt	gggttccaag
51121	tgtatatcaa	ataaagtata	aggccttggc	atggaatgag	ggcacaacag	atgtcatcct
51181	tggaatgaga	gctccaaagc	cctacccttc	ttctcaacct	ccttctctcc	ctcctgctct
51241	tcYgctgcag	tggtgtaggg	tgaacccctg	aggccctaga	agagtcatgg	cccctcatcc
51301	cactcccat	ctcctttttt	aaaaaaataa	tttttttacc	attatctgtg	ctctgagctg
51361	agctcagagc	cagaaggacc	actgagagca	ggaccagcag	catcttgaag	gaggctctgg
51421	agttgctccc	aactctgcgt	tgagagaaac	atggcagctc	cctttataaa	catgagcaga
51481	acaatggcag	ctttgagctc	catactgggt	ggacctcacc	acctgaaagR	ttaggttttg
51541	cttccctctc	ataaagtgtg	atgcgtctct	tattactttt	tgggatttta	gccagcagg
51601	atgtggtggt	aggatgtggt	taggtacaaa	ctgtgacttg	agcatagttt	ctgaagaaac
51661	agtatccaa	caatcagcac	aaatactaca	attgaagttt	ggatcatcatt	tgaatttcaa
51721	ttgggttaga	cagttagtct	ttcccttcca	ttggttgtct	gtgtgcacac	gtgcttacgt
51781	ttgtatatgt	ttgtcagcag	tgatcttata	gccagaagtg	aaaatgatta	atatctctag
51841	ctattagtgt	agcataaatt	ccatttttat	agcatatata	cctatatgga	tgatattgag
51901	cttaatttca	taataatata	gagatcattt	ctgtttaatg	ttgagttgtg	tgaggacaac
51961	acacacttgg	gcacacgtgg	atgacagaag	ttttaccctc	aggctactct	ggcccaaaga
52021	gattaagatt	ctcctaattc	agcattaacc	agagataact	tattgttgta	gaacacaggt
52081	attaaaacat	tctatcttta	ttaataYcct	ggaggttagt	aaggcaaaat	tggccacaga
52141	aagcaccatt	agatttctgc	atcagaacag	tgtgaataca	cagttccttg	aacaagccat
52201	gctattttat	gtccctaaga	cttcttccat	gatctttctc	ttttctagaa	tgttctatat
52261	gattcagttt	aggtcttact	tcttgtacca	aatattttta	tcacactggg	tattgagttg
52321	acacaataat	acaatctaatt	tagatagtat	gatagcctgt	tgaagccctc	aagtattaca
52381	ttgattttct	attttttaatt	tagtttccat	tctatttgct	tctcagattg	cctttaccac
52441	agattatttt	ctctgcaata	ttcttatact	cattcttctt	cactcttggt	ctgaacctta
52501	cttggtgata	tgttatatgt	tgaatcaatc	ctccctatgt	ctatgtttta	tatcttactg
52561	ctttcttcat	gcgttctggg	agaaatcttt	atttgatttt	ctaaacaagg	ttctgtactt
52621	ctctttgctt	gctttcttct	tttttgtttt	taaaatttgg	caccaagggt	ttgtgtttct
52681	gaaaagtttg	gtagggctct	gagttggtag	cttaatcttc	acctgctgat	ttttctgtcc
52741	tatctagtag	ttttctgctt	atattttcat	ggaaccccta	gatcaatcag	tatcaccagc
52801	tgccactttt	cattacaggg	Rttgtatagg	tctcgtatta	ttgttacatt	ttgttacagg
52861	gctgggtgata	atttgaggat	agcttggttg	gaagtatgac	agggctcggg	gaatgtgact
52921	ggaaatctta	aagacaggcc	tcttgaccat	tgtggataag	tggtcctgt	gctgtgcaga
52981	tgaaggctcg	gtctggcaat	tctgaagggt	tggaggtaat	attacaggaa	gattttctaa
53041	tcaatgggtg	ttgttatgga	taactttact	ttggcaaaag	gacccaaaaa	taaatatttt
53101	ctctggcata	attatggaca	tattttgaag	gtgaaatata	ttatgagtta	gcaattcttc
53161	tctatgtggg	aagcagaaga	gttctagctg	tgctttaggg	ttttatgggt	gagagagagt
53221	agttgttttg	gcctacagac	ccagctgtgt	tactaggatt	gctgcctctg	atttccacag
53281	acactgttta	acatgggaag	tggagataag	tagttctgcc	taggtggcct	atggtagacc
53341	Rtcaggtagg	aaaggaaagt	cagcgagaag	gagcaSagg	gcgtgccatg	cagacatgat
53401	tcactgtgtg	gggtggctgag	gaaactgcag	tcctgggtgga	aggcaggcct	ctccttggtc
53461	gggtgagtga	ggaagacaac	aggtgatgcc	tgcaaatatc	actcagctca	gaccttacc
53521	ctgacattct	ccagtgtgaag	caatgagaga	aagagattaa	tgtatcagga	aataataaac
53581	atcagctatg	atctcaccac	acacaaccac	aacagagggt	acggaggagc	tgaacagagc
53641	actgtcagtg	agtgaggggt	gggtcaaatc	gagaagcagg	actgcagcag	gagcttaggc

```

53701 acttgtaggt gaggtagcac tctcagcaat ccacttgccct tttaacaacag atgaaaactt
53761 aacatacccc taatataaatt cttgatttct acttctctaaa acctgctctc cttcatacta
53821 atttggtatg gctaccctaa aaaaatgcc cacaagtggc ttaaacaaca gaaatttact
53881 ttctcatagt tctggagcct gaagtacaag attaaggtgt caacagggtt ggtgtcttct
53941 gaggcacttt ctccttcact tctagatggc cggttcttgc tgtatcttca catgggggtt
54001 tatctgtaga cgtgcatccc tggtagccct ctgtggtctg tgctaaYgtt ctttcttat
54061 gaggacaggt gtcagatggg attagacca accctatcag cttcatttta acctaatac
54121 ctctttaaag gccatgctgc aaatagagtc acattcagtg gtatcggggg taagggattc
54181 aacatgagag tttggaggga acacaattta gctgataaca cctcacaatc tttctcagt
54241 tcatgacatt tgtttcactc aaccattcaa aaacataagt gtcactcttg attgtttagt
54301 ctctcccggt tactgccctt agcaaatacca attggttcta ctttcaaaag atatcccata
54361 tatgatcagt ttcataatct ctatcagaag gYcctgagtc aagccatgat tctccctcct
54421 ggaggacttt caacagtctc cagctgatct tggtagacatt cctgccctc accacatccc
54481 aWgcagttct ctttacaaca gccagagtga tcttttaaaa atagaattta gaacatcagc
54541 aagatggctg actagagttc cctggcactc atttccccac aaaaagaaat caagaaaaca
54601 aacaatttta tgtcagccag tgtgatttaa aaagtatgct ggagaccacc aggggaacag
54661 aaacacctct gtgaagtaca gaaactcaat atagcatcct gcctctgaca tactctctct
54721 tcagtcaagg ttggctcagg gtcacagta actccattct acaggaaaaa gtaagctgta
54781 gttccccagt ggtccacatt gccataaaaa atgtcaacaa tctttgcccc actgttctca
54841 ctggcacaaa aaccagtctg gagagcagtt gggatttcca aactgcattg cttacatag
54901 taagagacca ccttgagcac cctctgcccc tgcaatgtaa ggtgctatgg ctcatgcca
54961 tctccaaact gaacctacat agagagtgtg tcttgctttg agcatcagta gcacctggct
55021 ctctatcact tgaggcccca ccatcattcc aacacattca tacagggtatc tgcagacca
55081 tgaccttagc tttccagagc cttagccagat aaactaatca agaccccgcc atccgaaccc
55141 atgtgggtga ccaccaatcc agggaagaag tgaacagcag ggaagccacc catctgccta
55201 ctagccacga caccacatg caccacacc tcacaaccag ctagtctgct gagcctgtgc
55261 atgctgggtg ccagcctgaa aactggctct gtggtgggcc cacccccagg actacagcct
55321 gcttgggcca caacaactct gagttttgct atggtctaata aattggtcct gcagtaccc
55381 tgcctctctc gatgggactc tgcagagatg gatggccctg ctacacctgt gagcactgac
55441 agcaacccgc ccaccagca ggaagacMgc agtgcatgta agtgcacaca ccttgagaaa
55501 aggctcttcc cactgctgct ggtggcacag ttgctgctgt caccaccggg ggctgcagca
55561 gtgaaatgcc agttggacc cagcaagtgg caggatcctc agcatcttag catatgcagt
55621 gttctgcacc tcaggcactg gaaaggctgt gaaccagaca tagggagcca aagcacatgc
55681 tttccagaac cagagagctg cctccctgtg gctgctgaca cagacagcaa tgtcaccccc
55741 gcaacacagc agcagagatg ctgcacactt gcatgcaacc tggggacagg cctctccat
55801 ctgctgctga gtctgctgat gcagctgggg gccagagcat gtgcccactg cagtgcactg
55861 acttccacca gcagcagagc cactgtgaac ttgcacgtac cctgaggact ggcttatgct
55921 gctgccagaa gccaaagtgt gctccacatt gccagagagc tgctgtctag tgggtgtgct
55981 cactgacaat aaccacacc tgccctagca gcacagctgc agcaaatttg catgtgcctc
56041 gaggacaggg tttcttcagg tattgtctct gctattggga gatccaagga ttaccccatc
56101 caacttacca cagccaacat ccatgtacat aactaggggg actgaggaca ggcctgccaa
56161 gcctgggtcc atcatcccag tgcccaggca cactaccag ggggtgtggca atcatctgc
56221 tttgtccacc accactggca ttgacacatt cctttaggag gactgagaat gggcccaacc
56281 agcctgacag tagcactgta gccagaaaca atatgcatgc aacatctgaa ggtctggaga
56341 ctggccccca gcccatacaca accacctcta acaccagagc ttgcaacttg agaactctgag
56401 ggttgtccaa ccaagctaca gaaattgccc atggcaagca cattcccaga ggcctaaagg
56461 cccaccacc ctttcagcct accattgcaa ctgctagtac ccaggtaagc tacttaaagc
56521 cccagaatt gttctgctta aagctgctaa aactggtaca aacatatgtt gcctaggtgc
56581 caaatatag cactctcagc ccactgttac ccctactggg gcccagaac tggcccacct
56641 aaaaatctctg tccccaggaa aacctcacta cagcctccaa tcacaactac agcctaagcc
56701 actgaggaag tcacagacac cacttatgct gttaatagct gaaggaataa tataagacca
56761 ccttactgta cacacacaga atcaaagcca aagtgtccta ctgaatcaac accacagata
56821 catcttcaga aagaaaagtt aatgttttgg atctatgtca ctgccccaat ctcatgttga
56881 attataatct ccaatgttgg gggagggtct tcattggagg taattggatc atgggggtgg
56941 atccttcagt aatggtttag caccatcccc tgcgtactat tcttatgacR atgagtgagt
57001 tctcatgaga tttgcttgtt taaaagtgtg tgtcacctcc cccccacca gtccttctcc
57061 tgctatgtaa gatgcctgct cctgctttgc catttgccat gagcaaaagc tccctgaggc
57121 ctccccagaa gcagatgtca ctatgcttcc tgtacaacct atgaaactgt gagccaatta
57181 aacctctttt cttcataaat taccactctc caggtaactt tttatagcaa tgtgagaatg
57241 aactgatata gaaaattggg accgaagagt agggcattgc tataaagata ctaaaaatgt
57301 ggaagcgatt ttggagatgg gtaatgagca gaggttagaa gagtttggag gactcagaag

```

57361	acaggaagat	aagggaaaat	ttggaacttc	ctaaaaactt	gtaaattgtg	acccaaaatgc
57421	taatactgat	atggaaaatg	aagtctgggc	tgaggagatc	tcagataaaa	ataaggaact
57481	tattgggaac	aactggagca	gtcacttttg	ttatgcttta	gcacagagcc	tgggtgcatt
57541	gttccctcc	tttagggact	tgtggaactt	tgaacttgtg	agtgatgatt	tagggatct
57601	ggtggaagaa	atttctaagc	agcaaaagt	tcaaaatatg	acctggctgc	ttctaacaac
57661	ctaagctcat	atgcctaagc	aaagaaatga	gctaaaaactc	aaatttgtat	tWaaaagggga
57721	agcagagtgt	aaaagttttg	aaaacttgca	gcctggccat	gtggtagaaa	aaaaattccc
57781	attttctaga	gaagaattta	ccctagctgc	agaaatttgc	atgagtaaa	aataaccaa
57841	tgtaaacagc	caagacaatg	ggagaaagac	attgaaggca	tttcagagac	tttcgtagcc
57901	acaccacat	cacaggcctg	gagtcctagg	agggcagaat	ggtttcctgg	tccaggcgca
57961	gggccccact	gacctgcaca	gcctccaaac	actgtttcct	gcatcccagc	tgctccagct
58021	ccagctgtg	ctcaaagggg	tccagctgca	actgggctg	ctgcttcaga	ggatgccagc
58081	cataagcttt	ggcagcttcc	atgtgggtgt	aagtctgtga	gtgtgcagag	tgcaagagtt
58141	gaggtttggg	agcctctctt	ttgatttcag	aggatctaca	gaaaagccta	aatgtccagg
58201	cagaagcctg	ctgcagaggg	agtgcctcca	cagagaacct	ctactagggc	agtgcgaagg
58261	gaaaatgtgg	agttggaacc	cctacacaga	gtccccactg	gggcaactgc	tagtggagct
58321	gtgagaagag	agctgtcatc	atgcagaccc	cagaatgaca	gatcctctgg	cagcttgac
58381	catgcacctg	gaaaagctgc	aggcactcaa	tgtcagccct	tgagagaagc	tgtgggaaat
58441	gaaccctgca	aagctacagg	ggtggaactg	aaaaggcctt	gggaaccac	cccttccatc
58501	agtatgcctg	gttggtgaaac	atagaaagtc	aaatgagggt	attttgcagc	tttaagattt
58561	aatgacttcc	ctgctgggtt	cagatttgca	tgggtctgt	agccctttc	tttttacagc
58621	tttctctttt	ttggaacagg	agtgtttacc	caatgcttgt	actccccttg	tatcttggaa
58681	gtaactgttt	tttgaattta	caggctcata	ggtgaaagag	actagccttg	tctgagatca
58741	gcctttggac	tttcgacttt	tgagctaagt	ctgaaatgat	ttaagacttt	gggggactct
58801	tggaagggca	tgattgtatt	ttgaaatgtg	agaaggacat	gagatttggg	agtagtgatg
58861	ggctgaatga	catggttttg	atctgtgtcc	ccacccaaat	ctcatgttga	attgtaatcc
58921	ccagtggttg	ggaagactgg	catgttggga	ggtgactgga	tcagtagggc	agattcttca
58981	taactgggtt	agactatttc	tctcactgct	gttctcatga	tggtgagtaa	gttctcatga
59041	gatctgtgtg	tttaaaagtg	tggtgcatct	cgccccact	tggtcctgat	cctgccatgt
59101	aagactcctg	ctccagcttt	gccttttgcc	acaagtaaaa	gctccttaag	gtttcccag
59161	aagcatatgt	ttctatgctt	cctgtacagc	ctgcggaacc	atgagccaat	taaacctttt
59221	tttgaaaaat	aaattactca	ctctcaggta	tttctttata	gcaatgtgag	aatggactga
59281	tacaaaaatc	ttccccatag	aaagccaatt	taaaaaacag	aagaagcaac	tatttcacca
59341	gatgcgcaga	catcaatgta	aggacacagg	aaacatgaaa	aagcaagaaa	atatgacacc
59401	tccaaatcaa	cacaatactc	ctccagcagt	agattccaat	gaaaaagaaa	tttatgtaat
59461	gttggggaaa	atattttaaa	aatgatacta	atggagctca	gtgagataga	agagaacaca
59521	ggttaaaaaat	agaaagaaac	cagaaaaacca	tttcaggata	ttaaagagaa	attcaacaat
59581	gaaatggata	tcataaaaaa	gaatcaaaca	gaaacgctgg	agataaaata	atcaataaat
59641	gaaagaaaaa	tacatctgaa	agcttcRaaa	atagaatagg	tcaRtgagaa	gaaagaaat
59701	cagaacttga	aaacaaatat	tttaataaac	ccagtcagac	aaaaaaagag	ggataaaatg
59761	tgaaaaagat	gaacaaatcc	tacatgacat	atgggatgcc	ataaaagcaac	caaatttttg
59821	aatttgggtt	tttcccaaag	gcaaaatgaa	aggcaaaaac	ataaaaaacc	tatataatga
59881	aataatagaa	gaaaacctct	caagcttagc	aagagagtta	aacacctaga	tacaggaagc
59941	ttagatagat	acaacccaaa	aatattttct	tcatgtcaca	ttatactcaa	actgtcaaaa
60001	gtcaaagaga	aaaacactat	agaagtggca	gagcaatatg	gtggaataga	aggctccacc
60061	aatcatccca	cccacaggaa	caccaaattt	aacaactgcc	tacataatca	aagcaacttc
60121	ataagaacca	aaaatcaggt	gatcactcaa	agtacctgct	tttaacttca	tattactgaa
60181	agagggtactg	aagagggtag	gaaagacagt	cttgaattgc	catcgccacc	cttgtcttaa
60241	cccagcagca	actacataga	atggagaatc	tgtagacttg	gggagggaaa	gtgtggtgat
60301	tttgaactt	cgcattgaaa	tcagtgtctgc	cttgtgacaa	tggaaggcaa	aaccggggtg
60361	aactcagctg	atgtccaccc	acagaggggag	catatagacc	agccctagcc	agaagagaac
60421	tgtacattcc	agcagccaga	acttgagttc	tggaagcct	tgctactgta	ggctaaagta
60481	gtctgggtct	ctaaataaat	ttgaaaggca	gtctaggcca	caaggactac	aaactctagg
60541	tgagtctctag	tgctcagctg	ggctcagggc	aagtagactg	gtggggggcg	tgggtacatg
60601	acctactgaa	acatcagctg	gggtggctaa	agcagtactt	gggccatccc	tccctcaacc
60661	cccagctaca	cagcttatgg	ctccaaaaga	gaccacttcc	ttccacatga	ggagaggaga
60721	aggaagagt	aggaggactt	tgtctggcat	cttgatgacc	agcttagcct	cagtaggata
60781	gagctctggt	cagagtcagt	aagccctgat	ttcagactct	agctcccaga	tgacatttct
60841	agacacacac	tgggctggaa	ggaaacctac	tgcatgaaa	ggaagagcca	agtaatgaaa
60901	gaaccaatca	ctgctgatt	aaagagcact	tgggccttga	ataacaagcg	gtgatatcca
60961	ggtagtatgc	tgtgggcctt	gagtgagact	ctgagatgtg	ctgggtttcca	gtgagacca

61021	acacattcct	agctgtgggtg	ggtatggtca	gagattcctc	ctgcctgaga	aaagcagaga
61081	gaaaaagtaa	aggggacttt	gtcttgaacc	ttaggtacca	ggtcagccac	agagaagtat
61141	aacaccaagt	gggctcttga	ggtccccaat	tccaggccct	ggctcttggg	cagcatttat
61201	ggacctgctc	tggtccagac	ggggagccca	ccactataaa	aggtgagtc	tagatctggc
61261	agcattattc	accacaggct	gaatgaagag	cccttgggtcc	ttaagtgagc	atcagtggtg
61321	gcctgagaat	attcccatag	gcttgtgggtg	atggtggcca	gggggcaagg	tgctgcata
61381	tgaaaagggg	agattagaat	gggaagaatt	gcattctactg	gttttgagtc	cagcttaaca
61441	gcagtacaat	agaacacaag	gtaaatttcc	aaagtttttg	actctgggtcc	gtggctcctg
61501	gacagcattt	ttggacctgc	ctggagctaa	gggatcttgc	tgctatgaag	agaagcacat
61561	aagcctatcc	gtaagcccca	aagcagtact	aagaaggaag	attattgcta	tatgtgccta
61621	catcaaaaaa	taaaaaaact	tcacataaac	aatctaata	tgcatcttaa	agaactagaa
61681	aagcaagagc	aaaccaaacc	cgaaattagt	agaaaaaaga	aataaagact	agagcataaa
61741	taaatgaaat	taaaaattaaa	aaatacaaca	gaagaatgaa	acaaaaagtt	tgttttttga
61801	gaagatgaac	aaaattgaca	aaccttttga	cagactaacc	aggaaaacaa	gagagaaaaac
61861	ccaaataaat	aaaatttagag	atgaaaaagg	agatattaca	acctacacca	cagaaattca
61921	ggggattatt	agagactact	gtgagcaact	atatgcta	aaattgaaga	aactgataaa
61981	ttcctagaca	aattgaacct	gccaagattg	aactatacag	aaatccaaaa	acctgaatag
62041	acMaataaca	agtgtatgaga	tcaaagccat	aataaaaaact	gtcctagcaa	acaaaagacc
62101	aggacctgat	gacttcaatg	ctaaatttta	ccaaatatct	aaagaagaac	taatactgat
62161	ccttctcaaa	ctattctgaa	aaatagaagg	ggaaggaata	ctttcaaaact	catttgggtga
62221	ggtgaatatt	accctaatat	gaaaactaga	caaagacaca	ttaaaaaaaa	tacaggccaa
62281	tatttttggat	gaacattgat	acaaaaattc	tcaacaaaat	gctagcaaac	agaatgcac
62341	agcccattaa	aaatacaatt	catcattact	atgtggcatt	tatccccatg	atgcaagaat
62401	aattccaact	gtgcaaacca	atgaatgttg	ataaatcata	taaacagaag	gaaggacaaa
62461	actaatatgc	attgcaatag	ataatgaaaa	tcatttgata	aaattcaaca	ttccatcatg
62521	ataaaaaatca	tcaaaaaactg	ggcatagaag	gaaaaatgcat	caacattatt	aaaacctat
62581	atgacagacc	cacacctaact	atcatactga	atggggaaaa	actgaaagct	ttcctctaag
62641	atcttgaaca	tgacaaggat	gctcactgtc	atcattgtta	ttcagcatag	tacttggagt
62701	tctaactaca	gcaatcagat	gaaagaaaag	agaacggaag	ggaagggaag	ggaagggaag
62761	ggaaggggag	ggaaggggag	ggaaggggag	gggagggcag	gggagggcag	gggaggggag
62821	ggagggggag	gggaggggag	gggaggggag	agaaaagaga	gcatccaaaa	tggaaaaggaa
62881	ggagtcaaat	tatctttgtt	tgcatagtat	gaaactttat	gtttggaaaa	aaataaagac
62941	tcacaaaaaa	tgtatttagaa	ctgatagaaa	cattcagtaa	aatttcagga	tacaaaaatca
63001	acatacaaaa	ttcagtaaca	tttttatatg	cccacaggga	acagtctgaa	aaagatcaag
63061	aaagtattct	tatttacaat	agctacaagt	aagataaaat	acctaggaat	taaccaaga
63121	agtgaagat	gaaaagtata	aaagtataaa	acattgggtc	aagaaattga	agataacaca
63181	ctaaaatgga	aagacattct	atgttcacgg	attggaagaa	tcagttttgt	taaaatgtcc
63241	atactaccca	aagcactctg	cagatttcaat	gcaatcccta	tcaaagtatc	aaYgacattc
63301	ttcacagaaa	cagaaaatac	aattctaaaa	ttcatatggt	accacaaaag	actcagaata
63361	gccaaagctg	tcctaagcaa	aaagaacaaa	tttggaggaa	tcacattacc	tgactttaaa
63421	ttgtcttaaa	tactacagaa	ctatggtaac	caaaatggca	tgacactggc	atagaaacag
63481	acatKtttgg	actgtgagcc	tggcctctat	gaacctcgt	ttcagctcct	gatttggcca
63541	gagccaaggc	cctgggcca	gtgagtcac	aagttctcca	agacagccca	tggactaagt
63601	gcattccttc	cccttcccag	tccataaaca	ccctggacc	cagcctcata	gagggcaatc
63661	catttgggtc	cctctttccg	ctggcagaga	gctttcttct	tttgtttgtt	aaacttatgc
63721	tttaacctca	cattgtgtct	gtgcttctca	atcatcttgg	acgtaggaca	aagaactYca
63781	gatattatct	cagacaataa	gagactgcta	tctgggtccg	ttggcaaaac	tacaacatta
63841	caacaagaaa	actttgggga	aactctccag	aacaccatag	tgggcaagaa	tttcttgagt
63901	aatacctcac	aagcactggc	aactaaagca	aaattaaaa	taaaaaaaa	cttcaagat
63961	aaaaattatt	aaaaagagaa	aagcatccag	tcataatgaa	gggaactatc	accagatcaa
64021	aagagaattt	atcaacagaa	agtttatagg	ctaggagaga	atagtattga	atattcaaa
64081	ttctggaaga	aacactttca	gtcatacata	ctatactcag	aaatgttatc	cttcataaat
64141	aaagaggaaa	taaaatcttt	cacagataag	caaaagcttt	agactaacct	tacaacaagt
64201	gctcaaggga	gttctacatc	tRgaagcaaa	cagatgataa	tcactatttt	gaaaatacat
64261	aaatactcac	tgttagagaa	gacacacaaa	gaataaagag	aatacaagcct	tattatttca
64321	gaaaactaaa	agaaatgata	aacaataaga	gaggaagaaa	ggaagaaagg	gacatataaa
64381	acaaccagga	aacaatgagc	aatatagaaa	aaccaaacc	tcacatgtga	ataataacc
64441	tgaggtaaac	aaattaaatt	ccccatttaa	aagatatata	agtcataata	aagggaacct
64501	ccattagatt	aacaacgaat	ttgtcagaag	aaaccttaca	ggccaggaga	gaatgagatg
64561	acataattcaa	agtattgaaa	caaaaaaaat	cttatcagcc	aagaatacta	tttccagcaa
64621	agctatttctt	caaaaaatgaa	gtagaataaa	tgcggttct	aaacaagaaa	aactggaat

64681	tcactactac	tacactggtc	ctacaagaaa	tcctgaagga	aattctatac	tttaaagcaa
64741	aaagacaata	tggtccatca	caaaaacaca	cacaagtata	aaactcactg	gtaaaccaaa
64801	tacacaaatg	aaaaagagaa	aggattcaaa	ttttaccact	acataaaatc	aacaaatgac
64861	aattataaac	aataaaaaat	atagaaaggt	aaaaggacat	atgaaataac	cagaaaacaa
64921	ttataaaaa	gacaagaata	aatcctccgg	tagtaataag	cttgatggta	aatgaaactaa
64981	aattttcagt	ttaaagatat	agactggcct	aatggatttt	aaaaagcgtg	acacaagtat
65041	atgctgccaa	taataaagta	aatttctctg	taaagacaca	tggaacttaa	gtgaagggat
65101	gaaaaatgat	attctatgca	aatagaaaca	aaaagtgaga	agtactatac	ttgtatcaga
65161	taaaacagat	tttaattttt	aatttgcaaa	cagcaaaaag	acacaaaaaa	ggctcatcatg
65221	taagataaag	ggatcaattc	agcaagaggg	ataatacaat	tctaaatatt	caaacaacac
65281	tggaagcacc	agatatataa	ggcaaatatt	attagacata	aagggggaga	tagattccaa
65341	cagaataata	gtgagggact	tcaatgcccc	attctcagcc	ttagacacat	aatccagagt
65401	gaaaattaa	aaataaacat	tggaatttaa	ctgcacttta	gacatgtctc	aaaaaaaagt
65461	atacgaatgt	ccagtaggta	tataaaaaat	gctcaacatc	actcatcatc	agggaaatgc
65521	aaattaaaaa	cacaatatca	tccttctcca	gttagaatgg	gtattattaa	aaagaaaaaa
65581	aaaacagatg	ctggtaggga	ttcaaggaaa	aactcttaca	taccgttggt	gggaatgtaa
65641	attagtagag	tcactatgga	aaatatttgg	agatttctca	aaataactaa	aaatggatg
65701	accatatgat	ccagcaattt	cRcttctggc	tatttatcca	aagaaacaga	aatgaggaca
65761	tcaaagggat	acctatatcc	aaatgttgac	tgacagcata	ttcaccatag	caaagatatg
65821	gaatcaacct	aagtgtccgt	cagtggacaa	atggattaaa	aaaaaacagt	ggtatatata
65881	cacaatgtaa	tactattcag	ccataaaaaa	agaataaaat	catgtaattt	gtagcaacat
65941	ggatggaaact	ggagggcatt	atgttaaggg	aaataagcca	ggcacagaaa	aacaaacagt
66001	gcatgttctc	acttatgttg	atcacacaga	ggtagagaat	agaataatgg	ctacaagaga
66061	tggaagcagt	tttgtgaggg	aggaggacaa	gtatgaagag	aggttcatta	atgggttcaa
66121	acatacagtt	agaaggaata	aattcaataa	tttgataaca	gattaggggtg	actatgttta
66181	acaatatattc	aaaatagcta	gaagaaagga	cttgaacagt	tccccaacaa	tagaaatgat
66241	aaataactcaa	gatgacagat	accctaactt	gatcattata	cattctatat	gcttataaca
66301	aaatatcatg	tgctYcataa	atatgtacaa	acattatgta	tcaattttta	aaaatcagga
66361	ttgatagctt	tactgtctga	ttctaccaga	catttaaaga	ggaattgata	ctaattatcc
66421	tgaacaat	ccagatatgt	cagaggaaat	aatacttcca	aacgcatttt	acaaagccag
66481	cattaccctg	attccaaaaa	caaagataca	acaaaataaaa	aagccacaag	ccaacatccc
66541	tgatgaatat	caatgcaaaa	attcagaacg	attttagcaa	agtgaacgca	gcagcatatg
66601	aaaacgatca	ttcactatga	tcaagtgggt	tttattcaac	atatacaaat	caataaatgt
66661	gatgcaccct	attaacaaaa	tgaaggacaa	aggccatattg	atcatctcta	tagacacaga
66721	gaaagtattt	tataaaattc	aatatccctg	cataagaaaa	gctcacaga	aattagacac
66781	acaagatatg	tacctcaaca	caaaaaggcc	atatatgaca	aaccacaRg	taacatcatg
66841	cagaataaag	aaaggtgaaa	gatttcctct	aagatttagga	taaagataag	gatgttctact
66901	ttcatcactc	ctattcaaca	tagtattaaa	agtatttagct	agataatact	ggcaagagat
66961	agaaaYtaaa	Maaattgaaa	ttgaatgaaa	ggaagtcaat	tggttcatctt	ttYggatgac
67021	atgatcttat	ttatagaaaa	ctctaaagac	ttcaacaaaa	aactgttaga	ataaaattgg
67081	taaagttgca	gaatagaaaa	tcaatgtaca	aaaatttagta	gcatttctgt	atgctaattgg
67141	tgaactatat	gaaaaataat	tcagaaaaa	atttcattta	caataaccaa	aaaagaataa
67201	aatacttagg	aataaaactta	accaaggaga	taaaagatct	ctaatactgc	aaactatgaa
67261	acattgataa	aagaaattga	aaaagatgca	aataaatgaa	aagatactct	atgtttatgg
67321	atttgaacaa	ttaatatgtt	ggaagtggcc	atactaatac	aaatgatctt	cagattttaat
67381	gcaatcccaa	acaaaataacc	aatcagcata	cttcacagaa	ataaaaaaag	cacacacata
67441	ttttccgtct	ttgagtaatg	tatgtctctg	aaggggaaaa	aggcattgag	atacaaaagc
67501	acattataag	atagaaagct	ctatgtgcca	tttctctgtc	tttaccctga	tattagatcc
67561	aggaaactct	ctctattttt	aggccaaatt	attagcaaac	ttaatgtccc	ttcgccatgt
67621	aatttaacat	aaaacacag	ttctgggaat	taagatgtaa	acatctttgt	gaggcctata
67681	ttttcctcct	gcagagagaa	caggtaactc	tacatctctc	aaatttggtt	cagttgtgta
67741	tggaagacag	tatccctgat	ttggtaattg	ttaaactaga	cttttgcaaa	aggatatgta
67801	tgagtttata	taaaatttga	tagtattgca	tgtatttata	ctgtgcaata	tgtatatgca
67861	atagtttaag	tgacaaaact	aagtgttaca	aatttacctt	gaggttggtc	gcatttgtaa
67921	gttggggcag	tcacttcttt	ggagtgttgt	gcagacttgg	gaatgagaag	ctgtagattt
67981	cattcttaact	ctgccactta	cagcaggaca	accacttgca	aagcccagct	ttctctatta
68041	aaataagacc	ctaaaatctt	ccaacaccaa	taatgaagat	gacattctca	gatcaggaaa
68101	atgaaggggt	cttcagaagg	atcatcactg	tgctaggggc	agcaactgga	gatctgaaca
68161	aaatagctac	ctgggcatcc	aatccctcta	ctgtgaaatg	catgattctc	cagacctttt
68221	ccaacacgca	tagagctttc	tgatcgtttt	agtgcctact	cttaagtatg	aattgaatca
68281	aagggtgacc	agacaattga	agaaattctc	catcaaata	gactcaaaga	atcagaacaa

P A T E N T
Docket SEQ-4095-PV

68341	agtgtaat	tc	tgaagg	aaaa	gaggt	aaacag	agaaac	acaagact
68401	aattaata	ttctga	ataaaa	accata	ataaaa	aggat	gctatc	agaagatt
68461	ccagaga	acaaaga	ata	tgagca	ataa	taaat	tgataa	aataaa
68521	aaagtta	aggaat	cccc	tgagg	taagg	caaaa	agatag	ccataa
68581	aagaca	atata	aaat	ccac	ccaac	atgaa	agaaa	gtatat
68641	ggaaag	acatat	caatta	atactg	acatt	accca	gaact	ataatt
68701	ccataa	tgaa	aaaag	ccatt	gattat	ctaa	taacat	ttt
68761	tgcagga	agaa	caaat	ggagg	ctcac	atact	ataacc	ataa
68821	aaaat	cgacc	ctagg	ttcag	gttag	gtttc	catcca	agctg
68881	actgcc	tttc	taacct	ggcc	tagag	acaga	agaat	catgt
68941	actgat	cctg	caagct	gaga	ggtgg	gaaaa	tacgg	agtg
69001	gtgggc	cagga	gctga	gatga	ggccc	cagca	tgacct	ggcc
69061	gtttcc	ctgc	accaac	cctg	actga	tcctg	caagct	gaga
69121	ctcta	atgag	ttttc	agttc	agcaa	atcta	gttacc	agtc
69181	ttcaaa	atata	tttca	atctc	tgtaa	aaatt	ctctga	taaa
69241	gctatc	ttgc	agata	tctga	tttcc	taaaa	attgt	tattt
69301	taacca	actg	tcattg	tcatt	ggggt	cagta	actag	tttgg
69361	ggccat	ggct	ctttg	cttgc	tgtgt	tttcc	tgtgg	gtata
69421	agggtt	attata	atta	attcca	gtttt	tcagg	tctgg	gtgt
69481	tttgct	tggc	aaatc	ctcac	tgctg	gggctg	ttgcct	ccct
69541	caacct	cact	tttac	cttgt	ctttag	taaa	cggtt	ggagt
69601	aatgtc	ccaa	agga	attacc	ctgga	agtat	gagaa	acttg
69661	gaccta	agga	atgt	acctcc	taaag	catgg	tgctat	tgaa
69721	ctcctt	tggc	caagt	ttatga	acagt	gtcca	gaact	ggaga
69781	tttgtc	ctct	gctct	cttca	ggaat	attcc	tcctg	agga
69841	taaggg	atgc	ataat	gcatc	tcattg	ggcta	agga	aga
69901	aaggtg	gtga	ataat	ctgtt	tgaga	acatc	aattt	cactt
69961	aattg	gggga	gattc	ctctg	atgtg	ttgtg	ccagg	aagaa
70021	gaggtg	gaag	tcccat	ctcc	tactg	ctctc	ttgat	gattt
70081	agaacc	atct	cattt	tcata	cttgag	ctat	gtatt	tttcc
70141	tatat	ttgtt	ttgtg	tattc	tgttt	gttgg	ggtag	taagt
70201	actttg	gaac	tagtg	ggtag	ctatt	tttgt	gagac	aacca
70261	actgac	cctt	cagaa	aattc	ctccct	ctctc	ctgac	ctgca
70321	cacttt	ggag	ctgg	ctgtg	gtgg	gtgg	ttcat	cccat
70381	tctctg	atgg	gtctg	aggac	aaacct	acac	agcct	gtgcc
70441	cctgc	atgtg	acacct	tgga	ttctt	aggac	tggtc	ctacat
70501	accacc	agca	cattc	aacct	ggaag	cctga	gggtt	gtctt
70561	ccatgc	cagg	cacatt	tgca	aaagt	ctcaa	gaacc	actca
70621	aaactc	ccagc	accac	aggaa	actcc	cttga	ggtac	aaata
70681	gatatt	ggtg	tcaat	gtttg	ttgtc	tgagg	gctca	aagac
70741	tgccac	taac	atgtg	ttgca	gactg	ggcca	tctag	taccc
70801	caaaa	acttt	tacta	acaac	ctcag	cttta	gcaac	tgagg
70861	cgacta	gaga	caaag	aaacc	ataca	gatata	tatgt	atagt
70921	taaa	gtctg	tatg	caacca	acact	acaga	tatat	ctata
70981	tgaaa	gccaa	tcaag	aagag	gctgt	tactc	cagac	gtgca
71041	ataaa	catga	agatg	ctaga	aaac	atgaca	ccc	ctacag
71101	ggag	attgca	acaaa	ataa	aatct	atgaa	ctt	ctaaaa
71161	agaag	cttag	ttaa	atata	tagag	caaa	ataa	taata
71221	gaata	tgaat	aagaa	attca	ccaga	tacct	agatg	tcattg
71281	ttggt	tagtaa	agaat	tcaat	gaata	aaagta	aaaaa	aaaaa
71341	cgata	gacta	ggta	aggcag	aagaa	aaaaa	ttcac	cactt
71401	aaacc	agata	gaaa	atata	taaat	catct	aaata	aaagc
71461	atgt	agttac	caaag	gtttg	attct	gagta	ttcca	gataa
71521	agagg	ctga	caaaa	atttt	aaact	aagca	catgt	accct
71581	aataa	ataa	aataa	aaaaa	gaaaa	aaaaa	taata	gctga
71641	agca	agagat	ttaga	cattc	aaat	tagag	cctca	atgat
71701	agaag	tcctt	ctcca	aggca	tacag	tggtc	aaact	gtcaa
71761	taaaa	acagt	aagata	aaaag	catcg	agtca	tgata	aatgga
71821	gattt	tcact	gtata	aaactg	tgaa	agagag	ataaa	atcat
71881	aaaaa	aatct	gccag	ccaag	agcact	atct	tcagc	acagg
71941	caataa	agtt	tttcc	ctgaa	aagca	aaaaa	agaga	aattca
								tcacca
								caat
								gactg
								ccccca

72001	caagatatgc	ttaagggaa	tctgctcctg	aaagcaaaag	tacaatatct	accgctcatga
72061	aaacacaaaa	aattttaaat	actccctagt	acagcagaca	aatgaagact	tgaaatgatt
72121	taaattttac	tattatagaa	aaatactaaa	ccacaataat	aaaaagtga	agaaaaagaa
72181	acaaagtata	tgtaaaacaa	acaaaaacaa	ataacaaaat	gaagtaattt	ctcacatatg
72241	aataataatc	ttgattgaaa	attgattaaa	ttctccactt	gaaagacata	gactggctga
72301	gtgaattttt	aaaaaatatc	ctaactatat	gctgcttaca	agaaactgac	ttcaccta
72361	aagacacata	tagactgaaa	atgaagggat	agaagaaaat	atcccatgta	aacagaaaca
72421	aaaacaagtc	gaaataggtg	tattaacatc	agataaaaat	gactctatgt	caaaaacagt
72481	aatgagagaa	aaagaaggtt	attattttaa	aatagaaaag	tcaatttagc	atgaggatat
72541	aacaaaacta	aatatatccc	cccaacacta	gagtatacct	agatacataa	agctatcatt
72601	atgacatcta	aaaggataaa	tagattccaa	tacaatagta	gtgtaaacct	taacacctga
72661	ctctcagcat	taaacagatt	atttagacag	aaaatctaca	aagaaatatt	ggacttaatc
72721	ttaagaataa	ggggacccaa	tatacattat	agacattttt	atttaacagt	ggcaaaaact
72781	accatttttc	ttattagcct	gtggaagatt	ttctaataca	gaccgtatgt	tagggccaca
72841	aacaagtctc	agtacatttt	gaaaaagcag	tatactttat	tttcatatac	cacaatgga
72901	aaaactaaaa	atcaatatata	agaggaactt	tggaaattgt	agaatacat	ggaaattaaa
72961	caacatgctc	ctgagcaacc	actggttcaa	tgaagaaatt	tagaagaaaa	ttaaaatgtt
73021	tttgaaatat	gacaatgtaa	acacaacata	cagcacaaat	agtgctaaga	ggggagatgc
73081	tctgaataaa	ttctttcatc	caaaagtaga	gagatttcaa	ttaaacacac	cagtgtacca
73141	cctgagggaa	ctagaaaact	aaaaacaaac	tgaaccccaa	attagtga	ggaaaaatat
73201	agtaaaaaata	agagcagaac	caaacacacta	gaaactaaaa	aaaaacaaac	ccaaactcaa
73261	tgtaatgaaa	agttggttta	ttgaaacaat	aaataaaatt	cctaagtgtc	tagctaggct
73321	atactatata	tgtgtgtgta	tatatatata	tacacacaca	cacacgtata	tatatatatg
73381	ctatactata	tatatagtat	agatatgtgt	tatctataca	tataataaaa	tatatatata
73441	gacagaaaaa	actgaatgaa	acaaaatcag	aaactaaaaa	gaagatatta	caacttatat
73501	catagaaata	caactgtata	ttttggacaa	taatacacta	atgaaaccgt	atgttttgaa
73561	caagtataca	ctataattga	acaccatgga	aaaagattaa	ttccctgaca	tatacaactc
73621	acacaaaatg	agccaggaaa	gaagggtaaa	cctgaacaga	ctaataatga	gtaaagaaat
73681	agaatcagta	ataaaaacga	aatctcccaa	caaagcaaag	tccaggcccta	gatggtttca
73741	ctgatgaatt	ctaccaaaact	tataaggaaa	aaggaaaagc	attcctcatc	aaacaattcc
73801	aacaaattca	gagaagagaa	tacttcctaa	ctaattttac	aatgccagga	ataccccaat
73861	gctaaaaaca	tacacgaaca	caacaacaat	aactataaca	aaaattagag	gtcagatttt
73921	ctgatgaaca	cagacacaaa	aatcctcaag	aaaatgttag	caaaccacaa	ctaagaacac
73981	atcagaaaaga	taattagcaa	taatcaagt	gtattttatcc	cagggatgca	agaatgggtc
74041	agcatatctg	aatcgataaa	tggtgtacat	cacattaaca	gaataaagac	aaaaccacaa
74101	aagcatatga	atagatgWag	gaaaaagcat	ttgataaaag	ttagcatcca	tttatgataa
74161	aagttcccaa	cgaactacac	aaagaaggaa	tatacctcta	tataatgtaa	ccacatgtga
74221	cgaactcaca	cctaacatac	agaatgggga	aaactgaaag	ccatttctct	aaaaactgaa
74281	ataagacacc	actcagtcac	cattttactt	tatgtcatgt	cctagcgaga	agaatcaggc
74341	aagcaaaaaa	ataaaaagcc	atccaaattg	gaaaagagga	agttaaattg	ttcctgtttg
74401	cagacgacat	agtcttatat	taggaaaaac	acactggggc	ctttcagagg	gtagaggggtg
74461	gaaggagaaa	gaggatcaag	aaaaataact	aatggtacta	ggcttgatac	ctgggtgatg
74521	aaataatctg	tacgacaaac	cccctgaca	caagttttacc	tatgtgacaa	acatacagtt
74581	gtacgtctga	acttagaata	aaagttaaaa	aaattgttaa	cataaaaaaa	gaaaaatcta
74641	aactccacca	aaaaaattta	ggactattca	ataacattgc	aggataaaaat	atcaatatgc
74701	aaaaattagt	agcatttcta	tatactagca	ataacccagc	aggaatgaaa	aatcagctat
74761	gaaattccct	ttacaaaagc	ataaaaaatt	aattactcag	taatacattt	aagcaagcag
74821	actgatgttt	accagctata	tgactgaaaa	tgctaggcaa	tcatattgag	ctttgttttt
74881	ttcatctgaa	gagtaaacat	aatgcaagga	attattaaag	ggctaccata	ggaataaaa
74941	agctaattgt	ataaaaacatt	attagtatta	ttagtattgc	atagtatcta	tgcaatagt
75001	taagtgcagaa	actgaaatgg	cagaaatcta	cttttaataa	ccattttacat	ttaatgtaat
75061	tattgggtatt	tttgagccat	ttttgttttt	catattttata	ctacttttga	ttgtttttct
75121	ttttcctgat	ctatggattc	cttgaaaatg	ttttttgatt	ccatttttagt	tgatctgtaa
75181	attttttgcg	tgactctctg	tacagcattg	ttagtgggtg	ctcYgtgta	cattaygcat
75241	acataScttt	tcacagcccta	gtgctgtgca	cattttaccc	tattcagtaa	aatatggaaa
75301	ccttgctttc	ctgtcttttt	aactgctccc	cctttccccc	tgttgttaac	agaatcatat
75361	taaaatatatg	tctatgtgca	tttagtgcca	cagtaaattt	tgctattttt	gctttgacat
75421	aaattttattg	tcttccaggt	ttgcagctca	gaaatctgaa	ctgggtctca	ctgcgttaaa
75481	tccatgtctc	aaggctgagt	tccttcctgg	agtctctaga	agaaaaagctc	attatcttgc
75541	cacatttcctt	ggccctcttc	catcttttaa	gctagcaatg	gccagttgag	ccatttgaaa
75601	ctcatgacaga	aaacgtgaga	agaaagatat	tttgtgttta	cctactttgt	atttccaatt

```

75661   tttgtttttg gcttggtgtc attgttggtg ttgttgctca ttcttggtgt tgttgctcat
75721   tcttgatggt ccagaaaaat cctattctat tttttccttt atgattagtg accttcatag
75781   aaccattttta taagataggt ctggttgaaa gMaattctct tagatttttt tttctgtcctt
75841   ctaagaatgc ctgtatttttc tctttattga tgagtagtta tattggacat aaacatctgg
75901   ttgacattttt ttttctttca gcactttgaa ttttttagct acatcctatt ggttattctg
75961   ctctctggta ataacaccac tgttactcac attgtgtttt ccctatagct atgggtgctg
76021   ttgtttcttg ctgctttcaa aacatttttt ttagttttta gaaatttgac tacagtgttg
76081   ctgcatgga ttttcttggg tatattctgg ttggcagttg ctcatcttct tgcattctga
76141   ggtttatgcc cattgcaagt ttggagaatt ttcagccatt atgtctttga gttctctctc
76201   aatagcatcc tcattgttct tcccttctga agctcagatt ttatcattat cacattattt
76261   gttataacct ttcttgttca taacagtatt taaaatttta ccctgtgttc gagtatacag
76321   tttctattaa tccagcctca agaatactga ctctttctct catcatttcc tttctgttag
76381   tgatcacacc aaataatatt ttatttaatt ttttacta catatctcag tatcaaaatt
76441   tctatgtcat tatattatat agtttctttt ttctgctggg aatttttttt ccatttaaat
76501   tgagagtgtg cacattgacc tcataatgga tgtttgtaac acctgcttca gtgagattga
76561   aaatctcacc gttttaatat ccagattgtt tcaaggttat catctcttga ttatttaact
76621   ccttgagaat tggtcgattg ttctgtattt tataaagtat gttgagtaat tttctatttt
76681   atcccacaca caggactttc tctgtttaca gtacacaata agttcaatga aggaagtttt
76741   ggacattgga gggtagaggg ctctctgctt aattgagatc cactcactgg ttcagatagc
76801   aggggatttt gtcccactaa catttttcta cttggagctt ctgcctggat gatcctttat
76861   ggctcttacg agataaaact ataagtatat ttaacatcat agcatacata gtgtgcaactg
76921   aaggggtccc aaaaaattcc tattcacaaa gtctttttta gttttctttt gtgcatcatt
76981   tgctcaaatc tcaattgaat ttgaggactt cattttcctt tcttccctac agtaacaaca
77041   cagtttaaca cctgcttaat tagagtctat tacagtacc gggtaggcct gctgtcttct
77101   gactggggat ttatagaaag tggataatac ggctgaggta aaatcaacga ctacaggcct
77161   ggcgaaatgg ctcatgcctg taatccaaact actttcaagg gcagaagtgg gagaattcct
77221   tgacacaagg aatttgagat atgcttgggc aacatagtaa gaccagctct ttataaaaaa
77281   attacaaaaa gatcctggct cggttggttg cactgtaga ctcagctatt tgggagggtg
77341   agctgggagt atagattgag cctgggagag caaggctact gtgagccatg attacgccac
77401   tgactccag cctaagagag agagcaagtc aaagtctgaa aaaacaacaa tgaaaaccac
77461   ccaaaaaaca aaaaagacta gggccaccaa aaaggcttct ttttcaact gacttcttgc
77521   tccagggttt acctttttaa agtgcacctc ccagtgtcta gggagtctac agacttggag
77581   tctcttctct tcttgccctg gtatcacaaag tggctccatc ctatatcctt cagcactcct
77641   tccccatttc ccacagagcc aagtagaata gtgatttgaa cacatataag caattttaat
77701   ccttaccctc cttgatgctt tacaaaaatt tgggatggat ctgttaagct tttgtctcat
77761   ttgagtcagg gatattctcag gccagctca aatcctttaa ggaactgaga tcagagtaga
77821   ggaatagaag tgataaggga gatattgata aagtgtcttc atgcaagtaa acaagacaca
77881   tttaatttca aattcaagca gtgcagacat tgctcaaaac caattgaata aacatttgaa
77941   ttttaggtct ccccaaaggc ctacaacagt gatggagat cttaattct tctacctctt
78001   gttctctatg gaaaaaagca aatgtaaagg tgtcatttgg taagtttgtt tcaattctac
78061   catcagatac tcagttttca accatttccc tatcctactc attaatgaac agcataaggg
78121   aaattttcat acattttggt caacatacca gctattgggt tgtccttttt acattaaactg
78181   aagaataata aatagtcttt acagatgtta cgagattaca aaacaaaaag catccaagg
78241   atctaatta ggggtgaatg tggatgccta atggttttct atcagaactc tcaccaattg
78301   ccctgtctga tgagagaaat gagcaggagc tctgtcgtgg tgaaggactc tgctgaagct
78361   cccccaggca tttctctact agagtcttg ctttctcaaa atattctcag aataagcata
78421   tattgtcctt ctctggccct tcagaaaagtc aataagcaaa atgccttgag cttcccaata
78481   aactcttaca attacctttg cactttcctc atccactctt ctttgactgg accactcca
78541   cctcttggtg gccattgctt tgattgtgct ttgtttcatg attgtactga taaagccatg
78601   ttatatctgc tgtcacaatt ctttgatgaa atgcttcagg atctttatcc cttatttaa
78661   attttcaggg aagcttcttc tcttgtctgt agctgctctg gttgccatag ttttggcatc
78721   cacagagtga aaaaatttgc caacattaat ttttcagtta gaatcatgta agatgaacca
78781   attaaaaaac atgaagggtt ggctattgtt tgtactctta atcttcattc ctcttctatc
78841   atggtatcaa caagatacat ttgatgtgaa tactctgtca ccgtagactt gagggtcagc
78901   accatttcat cccttcttga aataacatat ctacttgtga actgctgatt tcttcagcca
78961   ttatccaYat gaacttttca gaaagcatca gtgggttYac cttctttcat gcaagcttaa
79021   ccataaaatt tctctttgtt ttcactttaa ttttagaaaa atgtattttg ctcttatagc
79081   ggatgttttg aaactcctgt cttatttttc attattcctt gaaatagctc ctattcagac
79141   atcttacagc atatcagttt aggttcattt tgatgccaaa aaatgtggaa tccttttatg
79201   gtatttctta atataacata cattttcatg aactttttaa agacctacta cattacagga
79261   aggcctttca ataataaag aattgtcata ggtaacattg aattttctag ttgattaaggc

```

79321	agattaaMtt	tctgtttttc	tgctgacata	aatagtgtatg	tgggttgaga	aggaatataa
79381	taccagtggt	caaataattct	gcagctatgt	ggaaagtcaa	acagttgcaa	ctaagtgtca
79441	catgctttta	gggagtcata	gagtagctgc	ttgggcctag	caggtaccct	gatgttaaca
79501	ggatgattgt	ctctggtttc	accaaacatt	acttcaaaag	agttactgga	catgagcagt
79561	tttgccctagg	tagctttacag	tagaccttca	agtaggtaag	gaaggtcaga	gagaatgagc
79621	agaggtgaat	gccagtcaga	tgtgcctctt	tgagtgggta	gctgaggaag	ttccagtcct
79681	ggtgggaggc	aggcttctcc	ttgtctcctg	agtccaggaa	gagaacaggt	gatgtctcca
79741	tatatcactc	aactcacacc	ctattcctga	ccctctctaa	tgtcagaaat	gagtgagaga
79801	gatttggtgt	tcaggcaaga	ataaatattg	ggtatcaacc	taccagacaa	ccaaaacaga
79861	gattaccaaa	gagctgaagg	agacactgtg	actgacttag	aatggagtca	aagccaggag
79921	caggactgca	gcaggcgctt	aggcatctgt	acaggagtca	aggacctcag	caatccacct
79981	gtcatttaaa	atgaatgtaa	acataccgtg	taccaagtag	aatcttgatt	tccaccttct
80041	ataacctgtt	ctctttaata	tcaacaatca	ttaatttcag	accaagaaac	cagaatatat
80101	tgagaaacac	atcaatgaaa	caatacattt	cccagaacta	aaggttaatt	ctccatatcg
80161	aaagggccca	atgattatcc	aaaagcccaa	atttaacatt	ttcagggctc	agtgcagaaa
80221	gacaattagt	ggctaacata	ctccaactct	taataatcac	acattataaa	gcaagctaga
80281	ctctagggtt	agatcacatt	tccatgtaag	tccttcagcc	tgttgcttgg	agattgtctca
80341	tataagctgg	catagagact	aaaggtgtct	gtgtttccct	gtaacaatcc	tgaccccgca
80401	atctgagagg	tgggaggagg	ggggcagagg	gctgtctgct	agagaagcac	actagacggt
80461	gggctggagc	ccaggactga	tctgcccaag	cttcgagagc	ccctgccagg	catgttatgc
80521	tcccctatgc	ctcacttctg	agtttggact	agtggcaatg	tctacacagc	tcccaatgat
80581	aacccactag	agcataggac	tggcagagaa	taataaccag	aatatacaaa	caaacaactc
80641	aaaaacaaca	aaatagtcca	ttaaaaaagt	aacaagagat	agaaatggac	atcttttcaa
80701	ataagacata	caaataatca	acagtatgtg	aaaaataact	tatatcacta	atcatcagag
80761	aaataaaaa	caaaaccaca	ctatcacctt	accctattca	gaatggctat	gattaaaaaa
80821	aacaaacaaa	caaaacagat	ggtgggatgg	atgtggagaa	aggagagctc	ttatacacccc
80881	tgattggaaa	gtaaatagta	taaactctat	ggaaaaacagt	aYgatttctc	aaagaactaa
80941	aactcgatta	ctattcaatc	tagcaactct	actactgtat	ctatgcagag	gaaatgtaac
81001	cagtatatga	aaaataaatc	tgcacttcta	tgtttattga	aacaccatac	acaaYagcaa
81061	agatatggca	tcaacctaa	taacctcaa	tggatactaa	tgggtttgta	ggtaaagaaa
81121	tcgtgatata	tacacaatgc	aataactact	tgcaaaaaaa	aaaaaaaaaa	aaaaaaaaaa
81181	ggaacgaaat	cactcctttt	gtagcaatac	gaatggaaact	ggatgtgaca	gataatatgc
81241	tatgtgacaa	aggccagata	cagaaagtca	agtataacat	gttgctacta	ataagttagt
81301	gctaaaaatg	gtttacatag	atatagaggg	gagaactata	gacactgaag	ccttgggaag
81361	gtgagtgggt	gggagggaat	taagagttag	acattaatta	gtaaatgcaa	tRtttgtat
81421	tcttggttat	gaaaccctaa	ggccatgatt	taaccattat	gcaatgtata	catgtaacaa
81481	aattatcttt	gaaccacata	tatttataaa	aataaagttt	aaaaataaat	tgagggtgac
81541	cgggtgcggg	ggctcacgcc	tgtaatcaca	gcactttggg	atgccgaggc	ggatggaaca
81601	cgaggtcagg	agttcgatac	cagccgtacc	aacatgtgta	aaccccgctc	taactataaa
81661	tacaaaaaatt	agccaggcat	ggtggtgcat	gcttgtaatc	ccagctactc	aggaggctga
81721	ggcaggagaa	tcgcttgaac	ctgggaggcg	gaggttgtag	tgagccgata	tcttgccact
81781	gcagRccagc	ctgggtgaca	gaatgagact	ccatctcaaa	ataaataaat	aaataaataa
81841	ataaataaat	aaataaatat	aattgaaggc	aaattttaagc	atattttttc	aaaaaagaaa
81901	aagagggaga	tggagttaga	gaaataaaaa	agaagggaaga	ggaggaggag	gagggaagaaa
81961	gagcctgcat	ttctaattgt	cataattaaa	ttcccataag	cagatactat	tttttttaaa
82021	aaaaaccta	ttagaatttt	acgggtctga	taagaaagaa	aatgctaaaa	aaaatatgRa
82081	tactcaRtgt	gttcttattt	tgtttgaaag	cctagaaaaa	aacaatatca	gagactattc
82141	tacttagatt	ttttggacaa	agaaatctta	agatttttaa	ctcgggaaca	tttaattcct
82201	cacaatttca	tgtctgctgt	tctttcttaa	aatcattatt	gtgaagcaga	catgactata
82261	tccactagt	tttcatgtat	gtgatctgct	tagtcttcat	ccttttagggg	agccattttg
82321	attattcaaa	aatttagaag	aggaaactta	ggctctgaga	cttaagtagc	ttcctatgag
82381	tccagagtta	gcaagacata	gttcttaaac	tgcaatctga	gagattccaa	attctttgcc
82441	cattcaagtc	aggctgcctc	tgatgaaatc	catttaggtt	ttcttaagaa	tagtaagact
82501	cataggcagg	gacagaactg	atcagtgata	aaatatggga	aaataggctc	agtggtctct
82561	ggggaataga	ggcatagAAC	catactcatt	tccttagaaa	acaaaatcgg	ttacttttga
82621	acttgtaaaa	atcttctctca	gcttctggga	ttttctttca	ttggtattgt	tttgcttaca
82681	ttcataagct	gactagaata	tcaagaaatg	acctgaaat	aattgtacaa	cttaaatctg
82741	agctatagaa	gacagagaag	gaaagaaaca	gtggaactcc	ttccccaggt	ggatgactta
82801	ataaggataa	ggaggagaga	agcttgctgg	aaacatcaag	gagaaggggt	cctggatatt
82861	cttacaatgt	gaacatgggt	ctcagattct	agagtcccaa	acactcagaa	agagacacca
82921	ccagcagaaa	ttgcaagctg	attgttttat	tggataYtg	aagttagagc	atgatgccat

82981	gtttcacggc	atttgaacaa	ctgttatctt	cttatttact	tcctgaaaaa	gacaagcaaa
83041	caaggaagat	tacagacaac	acttgacatg	gcaggaaatg	tctaattccct	cactgggggt
83101	tactgcagtg	atggagatgc	aagcccctac	tcttgccctc	tatcccttct	acagcccctc
83161	tctccttagt	aatatcttct	ttgttactc	ttaaagccat	tgacacataat	gtgatttaaa
83221	gtgttgctta	gatgagaaag	agaaacaatt	attgttatgt	gttcattgctt	tgctgctgtt
83281	ggttatgtaa	gggctatttt	tacaaagatg	ggcactgcaa	catatcatat	aatagtgaag
83341	atgtgaatcc	Mgccttaata	tccagtgaac	gggattggtt	aaatagatta	cggacaacc
83401	aaacaataga	atagtataca	attgtaaaaa	caaaactaacc	aRtaaacact	gaagagatct
83461	aaatgaactc	aKgagaaagt	tttctaaca	ataaattttt	ccagtgaagta	agacacaaat
83521	ctgaatatac	agtatgggat	aagtgcctgt	aataaaagca	ttatatatat	ttatgtagca
83581	atatatatatt	caaaaagtag	attccaaaga	gtaaaagggtg	ggggtttttga	gaaggataga
83641	agggaggaaa	gatgagttag	gctcttacta	tttagctctg	tacatttcgg	ttcagtgaag
83701	ttagtctttt	ttagcttaag	catgtatgac	tttaaagtga	agtatactaa	aaatgagata
83761	ccattttaca	actgaaagtt	caaggaccac	ttagcaggaa	tactggacct	gaaagcctga
83821	tgtgaggcag	gactgagcaa	agcatgttca	ggtgaaaact	ttaaatggga	gtctgagttt
83881	gaggaaagaa	aatagagaga	gccaaagggg	gaacatgggt	ctatgtcctc	attgtcaacc
83941	ctacttaaga	catgtaat	gaagaYagtg	attctcaaaa	tcagaattgc	cttcaagagc
84001	ttctgtaaaa	cacagggtca	cagggtcttg	atactctata	caagaatatc	tgaataacaa
84061	tttttagaaa	tgtgttccag	gacagggcaa	tattaacagg	ttttcagagg	attcattggc
84121	acaatgaagt	tggagaactg	tagcagttgg	agcctttgat	ggataataaa	ctggaatcgt
84181	acctgtcatt	gaatcctaga	ttactgagga	gactgccctc	gtggagggtcc	ttgtgggctg
84241	ccccttggg	gaggtggtcc	ctggggcttt	ccaggaggag	gtgggggagg	accttgctga
84301	tgccctccct	gttgggggtg	tccttgtggc	cttctctcag	gaggacgggg	atggcctccc
84361	tgttgggggt	gtccttgtgg	ccttctctga	ggaggagggg	gatggcctcc	ctgYtgggg
84421	ggtccttgtg	gctttccctg	aggaggtggt	ggaccttgtt	gctgctggcc	tccttgttgg
84481	ggtggtcctt	gtggctttcc	ctgaggagggt	ggtggacctt	gttgctgctg	gcctccttgt
84541	tggggtgggt	cctgctgagg	gccatcatcc	tggttcccat	caccagcaga	gggttgagat
84601	tgtctgcttc	ccaaaagggtg	tcctgacgcg	tcctcatcta	ggaactgctc	agagtctcct
84661	ccatctgtgt	gagttgaaac	aagaagagct	gagctcatgc	tggaaaacc	tcctgtcttc
84721	atacctctct	gtcttcacca	cacggccggc	ccctctctgc	ctgacctgcc	tctcaactcc
84781	caacctcccc	ccttcccaag	gcttcttaat	tagaactcct	cttaatccac	ataagggtga
84841	tgaaaaattg	aatttcttta	ctcatggtcc	ccagaatcaa	gggtgggaga	aaactgtttg
84901	tatcttggg	gcattggtat	tagccaattc	ctgacaagaa	aatggtgata	agaagacact
84961	ggagaactca	tcaatttttc	agggaaaaat	ggagacagag	tttactgaga	atttattggg
85021	atttacctga	tattacgagg	ggaacatctt	cctggctgac	atctagaaaa	gaagtacagg
85081	atgatgggaa	aagttacttc	ctgaatcatt	caaggctcat	agtgttctac	gaggataaag
85141	gacctctgat	cacaccctgt	gcattcccctt	tgtgatctca	tcagccactc	tctgatgcta
85201	ctggaagtgg	aagaagatgt	aagggaaagc	agtattgtta	ctacactgag	cgtcaaccag
85261	gaactcaaca	tagaagggtcc	cctgtttgtc	ctcttttgat	tccccaaagg	ttgatgagga
85321	atgaagatac	aataggtctt	ctgatcctcg	gcattgaaaat	tctgcagctc	catctgtttt
85381	ctcatcctcc	tctcttccct	ccactttcct	cctctatagc	atttgcctgt	aaacccttag
85441	cgcttattta	gttaaaactgc	tctgagtatt	tcaatgacat	atttggggat	tcttctgccc
85501	tccttcatct	gtaaaatagt	tgtttatggt	tgcaagcctt	ctcaacagga	gccaccagac
85561	atagccactt	ggatataatc	ttacgcagtc	cattcccagc	acattgaaat	actacattca
85621	ggagacagaa	aaatgacaat	gtttcactct	ggttattctc	taactctatg	tagacagaga
85681	caagtgttta	cccaattctc	tgccctcgga	gtagctctga	catgtgttta	tctcctcat
85741	taatgctcat	ccactgtaca	gcaaggccac	catcatccct	gtctactggg	atcagtacag
85801	gatcttcaca	gctgtacttc	cctgaatctg	tcttgcatc	tccacatcct	tcacagcagt
85861	cccatgtctc	tatataatgc	aaatctcact	ctctcacacc	cctagtagca	attctttatt
85921	ggattctatt	tgtgcaacaa	ataaactatg	aggccttgat	gaggaaatgga	ggtaacaatag
85981	atcttctgat	cctcagcatg	agaactctgc	agtcccatct	gttttctcat	cctcctctct
86041	tcctctccact	ttcctcctct	atagcatttg	cctgtaaaacc	ccaatcagag	tcacaatatc
86101	ttccccaa	tcattcttacc	ttcatttaaa	tcctgagctg	agctgaaggc	cagcagggtcc
86161	actgacagca	gaatcagaag	catcttgcag	gaggctctgg	tgtcactccc	aactttgtgc
86221	tgggagaaac	gtgtcagctc	cctttataaa	gacaagcagg	acaatgggtg	atttgagctc
86281	cctaccaggt	gggcctcctc	gcctcagaga	ctggcttctg	ctttgcttac	ttcaggtcaa
86341	gtgtatccct	catttctttt	gggactctag	ctcagcagga	agggttgggt	aggatattgt
86401	ttgtgtctaa	ttcctaaaag	gcacaactat	gacttggaca	aatgttttga	cggaaactgtg
86461	tccaagcagt	cggcacagtg	tcaggattga	acttttagaca	tcttttgggt	ttcaatctgt
86521	ttggaaagac	tgtctattctg	cttttactg	tgttttctat	ttStgtgtat	gtgagtttgt
86581	gtgggtgtgt	cgggggggtg	acactgatcc	tacagctaac	agtgaagatg	gtcaatatct

P A T E N T
Docket SEQ-4095-PV

86641	ctgactgttt	tgatagcctc	tttccatctc	tcgatgatgtg	tgtgcgtgga	tattttcaca
86701	tttagctaaa	tttttcatgt	aacagagatg	gtcttgctta	tctgtgagat	gtgtgaggac
86761	agcacactcc	caggcacaca	tatatgaRag	aaaggKgctg	gcagcctgct	caggctacaa
86821	gaattgtcca	aacttctgtg	aatctcacta	cactcaggca	agccttggtg	ctatacaaca
86881	caggaagctt	aaaatatattg	tatttttaaaa	atatcttttag	ggtttattaa	agcaaaactg
86941	aactcagaaa	ccaccaagga	atttctagac	ctgaacaaac	tgaatatatg	gttccctaag
87001	tgagccacac	gatgtcatat	agctaagacc	tccactttct	ccagaatatt	ccatagaatt
87061	catcctctac	tttattttctt	ctaataaata	ttgtaattgt	catcactgat	aattaaatgg
87121	ccacaattat	acattcatct	aagataattt	gtaataacctg	tccaagcctc	aattgccttg
87181	attggtcttc	tgcttttact	cagtaattat	gtcacctggt	tcatcagagt	gttctttctc
87241	accaaggatt	tttatctgta	atattccaat	actcattcct	tctcattcct	tttctcgac
87301	ttattttgtg	aaattttgta	ttctgagctc	accttgccat	gtttactttt	cgctctatat
87361	cttttttttt	ctccctacaa	aggctgcctt	tatttatcct	tctaagttaa	gggtgtgtgt
87421	actcctcact	acctttactt	tcatttttgt	ctgtataatt	tgacaataaa	aaattaagtt
87481	tccaaaaagc	cctgtcaggg	tcctgggttg	gtagctctct	cctcagctgc	tgattgctcc
87541	aaaaattaag	tttccaaaaa	gccctgtcag	agtccctggt	ttgtcgctct	ctcctcagct
87601	gctgattgct	ctgtgatacc	tagaaattcc	ctgYtcatca	attcataaaa	tatactactc
87661	agaatcacca	gctgcacttt	ccatttcaga	ccttgagtag	gtcttgtgta	atttttctact
87721	ttttgtgcat	ggttagtctt	tatttgagga	tagcttggtt	ggaggcatgg	ctgagaagcc
87781	aggtagacaga	aaatcataaa	gacaaggccc	tagacagggtg	tgcatgagtg	gatcctgtgc
87841	tgggcatatg	agggtctggt	atggctcttc	tgaaaagttg	cagataataa	tacaagaagg
87901	cttcctagta	gatttagattt	tgctacagac	gacattgttc	ttgtaaggga	cccaggcaga
87961	ttggtatttt	ccctggaata	aatatagacc	tatttcaggg	gggaatgcat	tcttaattgg
88021	caattcttct	ctggccctgt	gggaagttag	tcagctctag	ctgggccgtg	tgagttgtat
88081	ctcaggcaca	gagtagttgc	ttgagcccag	cagctcccaa	tgctgttatgg	agattattgt
88141	ctctggtttc	accaggtact	gtttcccata	ggacctggag	atgagcagtc	ctgcctcggt
88201	gacttcagggt	caaccatcat	gtcaaaaagg	aaggctcagag	aaaaggaaac	aagaggagtg
88261	ccaggcagat	attgcctgat	gatgtggggg	actgaggaag	ctgcaggcct	gggtgcaagc
88321	aggtttctcc	ttggcagcag	agtacaggaa	aagaacagga	aatcctccta	aaggctactc
88381	agctcaggcc	tgctccctaa	cctgctccaa	tgtcagcaat	cagcgagaga	ctagtgtatc
88441	aggaaagcat	aaatatcagc	tatgctctca	ctagacacat	caaaaacaga	ggtaatggaa
88501	gagctgaaaag	ggacactgtc	tgtgagtgaR	gggtgggtgaa	agggagacgc	aggactgctg
88561	caggagcttg	ggtacctaga	gggtgggtggc	agccctcagc	accacacttg	ccttctacta
88621	tagatgttca	tattctgagg	ccctgaaggg	ccagtcttca	acatatgaaa	ttttaggatt
88681	catctctcat	aacacatccc	aacattttct	cggctactga	cagggtgtta	ctagtgggtt
88741	caaaaaatcct	cgctccctcc	aggaacttat	gcattagccg	atctaattgc	ctccactttc
88801	aaaatacgtc	ccaaatatga	ccacttgccct	gatctttact	agaaggtgat	tgttcagcca
88861	tgatgctctc	tcctgggagga	ctttaccagc	ctccagctgg	tcttggtaat	gttcttcccc
88921	cagctcatcc	catatcagtt	ccctcaaac	aatcagagtg	atcattttaa	agtagaattt
88981	aggttatatt	acatttgtgc	ttcaaatctc	ctgttttttc	ttctgcactt	gtgataagat
89041	ccaaatttca	tgccctcagct	ctttcacacc	cacatgcctc	actctttttt	gaaaaccagg
89101	aagctctctg	aatggaacag	aaagtagaat	cttcttcgac	ttcaccatgc	tctagtttgc
89161	ctggaacact	aaagatggtt	tgccaggaaa	gatgaacatt	gRcagaggga	ataaacttct
89221	ctgagagtca	gtgagtttca	ttgggtcgct	gtggtctggc	agtggttatga	attggcagaa
89281	ttattctatt	aattgcacca	actaagcatt	ctgataatac	agtttagcaa	taaacacaat
89341	agtctctgag	acttcaactt	gctttgactt	gtctaaaaag	tttgggtgaca	ctattatggc
89401	caattaacta	ttaaaaatat	cttctatatt	tttaaatttg	atggttagtgg	tccataaata
89461	tatatatttc	acaattaatt	tagcatattt	cttttttttt	tttttgagat	ggtgtcttgc
89521	tctgtcaccc	agggtggggg	gcagtgccat	gatctcagct	cactgcaact	tccacctccc
89581	gggttcaagc	aattctcctg	cctcagcctc	ccaagtagct	gggattacag	gYccctcgcc
89641	accatgactg	actaattttt	tcccatctct	actaaaaata	caaaaaaaaa	attataYcta
89701	aagaaattaa	gtcacatggc	taRgggtcact	gtagttaatg	aggaaaaatt	aagttgattt
89761	tctcttctct	ttgtaattcc	agtttaaccg	gatgttgtcg	atgttgtttt	caatttagaa
89821	aatatgacaa	attgttcatt	agccatgagt	atcactctgc	tatccaccac	tttctaagaa
89881	ggcgcttatt	ttagaacaag	gctaacacta	aattacagga	aattaaagtaa	ttgtggcaaa
89941	ctagagaagc	atagtatgta	taataggtct	tactcagtta	gatccacctg	tcaaggctga
90001	gtccctttct	ggagtcctta	gagaagcacc	cattttttgt	ccacattcct	tgcccttctt
90061	ccatcttcaa	tgccagcaat	agccacttga	gcctcccctc	acatagcatc	acgtcgccct
90121	tgactcgact	cttctgcctc	cctcttctgc	agttaatgac	cttatggtta	cattgagctc
90181	acctagataa	tccaggataa	cctttctaaa	ttcagggtcaa	ttgattcgca	aatgtaattt
90241	ccctttgtca	tgtaagttaa	tataattcact	tgtctgagaa	ttaggaagtg	tgtgactttg

90301	ggagactgtt	aatcttcata	gaacacacag	gatggacacc	ttacccatct	agacctgggt
90361	tggctcagtg	agagttggag	agactcacc	aggcttcttc	cagatatttg	catgagaata
90421	tgaatgagtt	tatgtataat	tagttgttat	acaaatattt	gtgacttaaa	gtatatatct
90481	atgcaaaagc	gtaaatcaca	aactgagatg	gcaaaaattt	actttcaata	accattgaca
90541	cttaatgcat	tttttgatat	tttagagctg	tcataatttt	tgttttttat	ttatactact
90601	tttgattgtt	ttctttttcc	tgatctccta	tggggccact	gaaagtgttt	tataattcta
90661	ttttagttga	tccgtataat	ttttgagtgt	atctctctga	acagtgtttt	tagtgattct
90721	tctatgtttt	actttacatg	tacatagctt	ataatctagt	ggtgtacact	ttttaccagt
90781	tttagtgaag	tatggaaacc	ttacatccct	ttataatttt	taggtcaaaa	tgaatttatt
90841	atttttcagt	ttttaggttc	agaaatctga	actgaggttc	actgagttta	atccatgtgt
90901	caaggctgag	tttctccta	gaggctctag	agaagaatgt	catttttcca	catttctctgt
90961	ctctcttcca	tcttcaatgc	tagcaatggc	tggttaaaac	atatgaagaa	aactcaagtg
91021	aaaaaggaag	atatattgtg	tttgccact	ttccccctt	ctStatttt	tacttcatc
91081	ttgatgttcc	acaaatttct	cttctattct	ttcctttatg	tttagagaac	ttcatttggc
91141	tattatttaa	agatagggtt	ggttgaaaga	aattctccta	ggttcttagc	tttcttttt
91201	ttcttagaat	gcctggattt	cctttacatt	aatgaaggat	atttttattg	aacataaaca
91261	ttctggtagac	catttctact	tttgagcact	ttaaatattt	gtgctccttt	ctactgttat
91321	ttctggtttc	tggtSataat	aaccactatt	atttatattg	cattttccct	ataactatga
91381	tgctatttcc	ttctttctgc	tttcaatatt	ttgtctttaa	tttccagaaa	ttggacaatg
91441	aattttcctg	gaatggattt	cattggttgt	attctggttg	ggatttgctc	agcttcttga
91501	atcYgtaggt	ttatgctctt	tgctgtgttt	ggaaaatttt	tgatcattat	ttctctgagt
91561	cctttttcaa	catcaacctc	ttctgctttt	ctgaaactca	gaatgcatga	atagtacaYc
91621	atttgttata	gcctttcata	ttcatgatat	gatgtataat	ttttcaatt	attttaccct
91681	gtattgttta	gagtataata	tttctattga	tccaacctca	agaacactgt	ctttctcca
91741	tcattttctt	tatgctattt	atcatgcccc	ataaagggtt	tttaagacat	tatattttt
91801	atttctaaaa	tatctgtttt	cttaatttat	aatttataat	tcctattttt	ctgctgacaa
91861	gtttttcctt	tccatttcatt	ttgagtgtct	accttgacct	catgaaggat	gggtacaaca
91921	gtcctgttaa	agtctttggg	cttttaata	tctaagtaat	ttcaagggtg	taatttcttg
91981	attgtttcat	tccttgagaa	atggctcgatt	ttttgtgagt	tgttttgagt	acattgagta
92041	attttctgtt	ttatcttgca	cagagggtat	ttctcttttt	gcaatacaca	aaaagcccaa
92101	taagggttagg	ttcggacatt	ggagggtgaa	ggcactcatg	gtaaattatg	ctccaccaac
92161	tggtctcaaat	ggccaggagg	ttgtcccac	taacattttt	gggtgttttc	cctgggtcaa
92221	tctctctggc	acttatgaga	taatatttta	agtatttaat	atcacaccat	acatacagat
92281	ataaagacaa	taaaaagcag	tgcatcgaa	gggtccaaag	ggccctatcc	acaaagtctt
92341	cctaactttg	gtgtgtgtgt	gtgtgtgttt	gtgtgtgtgt	gtgtgcactg	tttgttcaat
92401	cctcatcagt	tgaactcagg	cacttctttt	tcctttttct	ttctaaacct	gctgttaga
92461	ggctgtcaca	gtagccagaa	ggcctgtcta	tcttctattt	gagtatttat	agaatgcagg
92521	aaaaaagagg	gtaaaactata	aagaacgact	gtaggccctc	ccggtgcagt	ggctcatgcc
92581	gttaatatca	gtacttgag	aggcagaggt	gggaggactg	cttaaggcca	ggagtcttag
92641	accagcctgg	gtgacatagt	gagactcctc	tgtctttaca	aaacactaaa	aaattatcca
92701	ggcatgatgg	tgtgtgcctg	ttgtcctagt	catttgggtg	gctgaggtgg	gaggaaaaga
92761	agggaaggaa	agaggagggg	atgggagggg	aggggagggg	tggtcttttt	tttttctct
92821	tggtcttctg	cccttctttc	tagtgcacct	cccagtaggg	tctcttttgt	atttctcac
92881	atgctattgt	cctccatccc	tcagcaccct	ttcccccaac	ccccagaacc	aagtagaatg
92941	gtgattttgt	cacatatatc	caacagggct	atactaattt	gagtccctac	tctccttgaa
93001	gctttgcaat	atgttgggat	ggttctgtag	ggtctttggg	gtcccttggg	tcaggaagat
93061	ctcaggccca	gcccgaatcc	ctaaagcaat	tgacatcaga	atagaggtaa	agaagtatac
93121	agggaatat	agagaaagtg	tcttcaggcc	agtatgcaag	acacatttac	tttcaataaa
93181	gcattattgc	cactactcgg	tggttaactg	aataagcatc	tgaatgtaac	aactttggga
93241	gacccctaat	cttttcacct	ttccaccaaa	ggcctgtaac	aactttggga	gatctttaat
93301	ctgtctacct	aatgtttatc	ggagaagaca	gctaaatcta	aaagtgtcat	ttggaaagtct
93361	gtttcagttc	taccagtggg	actcaatttt	caaccacttc	ccaatcctcc	tcattaatga
93421	gcaacataat	agaagaatat	ttattttacca	attacaaaaca	ttttagtcaa	catgttagct
93481	accagttccc	atggactttc	agcaaatcct	attaatcagc	ttgtaggatc	cttcacttc
93541	tcctcagaag	gccagggtct	tggtgtgtgt	tccatcctcg	ttgccaaaat	tattataagc
93601	taacaactta	gcttgtcact	tggtgtactt	gcagaaggca	aaagatgggt	tattattcac
93661	tgaagtacta	gcagtagtca	agggaatatc	atcgtagtat	ttcttcaagc	ttcaRtcccc
93721	tcacagggat	aagatgagaa	actgatgtta	catgtgcaag	tagtgggtgc	tatcaaaaga
93781	gaaatctcaa	aattaggaaa	ctccagtctt	aaaaactttg	atcactgtga	gtaacctgtc
93841	catcttgcct	tctgaagaag	aagctttaca	ctggaatgta	agcaaatatc	tctggagaga
93901	agaagaagaa	gagaagagtc	tttatcttta	aacaaatctg	ccttYtgacc	aagagggata

93961	ccctattttct	aaatcccaag	gctcttttgc	atgacctggt	cttgggcaaa	gtgaacgaga
94021	ctcctagggc	acaaaacgta	aaaaggcatt	caatagggtg	cagggcccta	aaaccaagtg
94081	gctcctcaaa	ctttgcaccc	tgcatgcctt	gctcacctga	tcctagttga	ggcccttctg
94141	tttgctcatc	aaacatactg	tttgctcaca	agataagagc	tagaccatgc	agaagtgcaa
94201	tacattcatg	gagaattttt	ttcccaacat	ccatYcccaa	gatcaagggt	acacagttgc
94261	caaagattgt	agagtattct	gaatatatca	tctattttct	tcctggacag	aactaaatcc
94321	atcagaagta	acttttttaa	aaaatgtttc	tttcttttgc	atacaatttg	ttttattttt
94381	agattaagag	atgagtccag	aggtaagggg	gacaggagaa	ctgtgacatc	agggatgaca
94441	ctaccctttg	agagcactgg	agcagttaga	aaggattgaa	agtgaataat	cttatttcac
94501	aaggggtatg	tcattttatg	attcaaatta	agtctgtgat	tatcacttag	caaaattgct
94561	aaaatcatta	tcagaatatc	ccatatcatg	ataggaggaa	gaaaaagaag	taaaatctaa
94621	aattgttatg	gaggtaataa	gaagactgcc	ataaacaagc	tatctacaga	attatggggc
94681	ttagggaattc	acagtaccct	ataaacaaga	acacagcttt	gagaatttct	atactcaat
94741	ttttaaaaaat	gaagtatat	ttgtgaattt	ttcaccacac	aattatttta	actggaagcc
94801	atcacagctc	atlaatcagc	aattgggtgaa	ggactaaagc	agcccaaatc	attcctgtct
94861	caaagtaagg	cctgcttgta	agcaagtgtg	aactggggat	gtatgtgcag	aatcagagc
94921	ctaagtattg	taagctggac	atttcagaga	taagggaaggc	agctggtgtg	tgtgaaatct
94981	tatatcaata	actgatttta	ttttttcagt	cctaattgct	attatggaat	ttgtgctttt
95041	cattattaca	tcttcacaaa	gcatgatttt	taactttaga	acaatttaca	ttttatgctg
95101	gataattctg	ttgtgaggga	ctgtcatgtg	cattgtgaga	tattgagcag	catccttgtc
95161	ctcgtagagt	tatcaggtaa	aatacacaggt	gtgtcagttc	aatttgaatt	tcaaatgaagc
95221	aacaaataat	tgtcatgtgc	tgtgtatcca	attatcaatg	ctgcaggtct	gtaattggtc
95281	ctccatagca	cacttacatt	atgatgtaaa	ctcatattat	ggttatcaca	agtaatactt
95341	atttataaat	ttattcttgt	tgttttttct	ttgtctgaa	atgtaaat	aactaggcct
95401	cctatatattt	tatttgctta	atctgttaac	attacaatag	atgccagcag	catccgtcca
95461	attttaactg	aaatgtctcc	aggcattatt	aaatgtcccc	taggggggca	aaattgccct
95521	gtgtggagaa	ccactgtcct	aaagggattt	catcctttgc	acatggaaat	ctcgtggtct
95581	attctctgga	tatttttaatt	ttatttcacac	atttaaaatt	tcgttttagg	cctgcaatgt
95641	ccaggttatt	tttctaggg	ttactttttg	ttctatcgat	taccatataa	ttactttttt
95701	aaaatacttt	ctgcaatgtt	gaaaatttgt	cttttgtctt	tactgctgaa	aattatat
95761	tttgcttgca	atatgttctt	ttttttctta	gagagaacgt	aattgttctt	caaaatctgc
95821	ttccaattat	ttcattttta	atattttat	Ytgttacctt	aaacttgcca	ttgtgtctt
95881	ttatttaacc	tgtatttttt	acatgctttc	tcattacatt	tttaagagga	gacgttctta
95941	ttaaattcaa	ttctgtaaac	tgattgggtta	tccctgattt	gtttttcttt	tcaaaacttt
96001	atttattttt	ctttctttac	acagtgaact	tcatacaatg	agatcctgta	ttgttacta
96061	tcgtcttggt	cttctatatt	ttatttact	aaacctggta	actctacact	agatgccagc
96121	agcagtcctc	caattttgct	tacttaaaat	cttactgatt	ttttaatacg	tgtccttgcc
96181	ttcctttacac	agttaaacca	ttgagtaaaa	ttttattggt	agtccaaaga	ttcagattct
96241	acagttacaag	tctgtgtgta	atgggtcaaga	ttgtaacatt	tttgatgggtc	aaagttgctt
96301	agtgttttta	actgaaaatg	actgaaaata	ttaacagaat	agggcttata	tttggaata
96361	actcttagtg	atgtacattt	caattgactt	tgtttcatat	cctcaaagtt	ttcactaagc
96421	tgtagactct	actaactatt	ttcatttgag	ttttcctttc	tagtttttaa	ttatcaattg
96481	atcatcattt	ttaggatagg	aactaaatcc	ctatgtgttt	gtacatataa	atctgatttt
96541	atatacactc	tatacacata	catagatatt	ataattcttg	atgtatttct	attctattct
96601	aatgcttatg	caacatatta	ataaaattta	aagatagagt	aatctattat	attgatcaca
96661	gtgcctaagt	aaaaatgcat	tttcaatata	ttagaatttt	actattaaat	acataatctc
96721	catatatggt	gcaaacaaag	tagcaatctg	ttctgcttaa	tttaaatcag	caagtatttt
96781	caataatgct	caatatatca	tagaacataa	tgagaaaata	agaggtaggt	gaaagaaaca
96841	aatgtgtagc	cctcctgttc	ttcttccttt	ttttctttct	gagaatatca	tcactcatat
96901	caggcatggt	tataaaaatg	agagattatg	tccttttttg	catacttcat	cttcttcagg
96961	acacagagag	aagcttgctt	cagtttgctg	tcccgtaaaa	ttagaagaaa	tgaatggcca
97021	gatggatgga	aaaataccag	cacactacta	aaagtccctg	ccgcaacgaa	gtctagaaga
97081	ggacaggcca	atgttagtat	gatactgatg	aaataatgca	caataaagag	gagtagaaat
97141	gaaattatag	cttttatagg	ttttactagg	gcttctgtgc	tgggatccct	ggaataaata
97201	ccatgtagct	tcatctgcct	ggtgtggctc	cataaggaga	ggattaagag	aagaatggaa
97261	gccagtgttt	ccacaaaagg	aaggatgaac	atcatctgaa	ggagaaacag	agaagtgaat
97321	tcatgcattg	tatccatata	attaaatgct	aagttgcctt	ttattgttac	ccgttcttag
97381	attaaactat	taattattat	ttccttcaga	atggaagttg	tgcagaaaga	gatcgttgcc
97441	tctagtacaa	taaagagaag	cacctgtgtg	attttccatt	tcatccagag	gaaaatggga
97501	ttggagaagt	tggtacctt	gaggaaatag	aagacactga	ggcaagtggt	acaggacagg
97561	cagaaatagc	tggatcctgt	ccagagaatg	tcaaaactta	ctgcaagatt	cttagaatca

```

97621 ggcattttct catagcctat attgaaagag gtagctaaaa ttgttatcta caggaaacat
97681 atcctggaga tggccaagca gttgagaata aaatcaatca gggagacctt tcagttcctg
97741 attcagtc aa tgatattaac caatacaatg aatcaatttc ccacagtcctt cattatgaat
97801 tacactacaa gaattcttat aaacagtgct tcccaaatgc ttgacatgcc tctacatagt
97861 gaactctctgc cttcaatata ccattggctg attgatccta gctgcactgt tatagattta
97921 tatatccaaa ggagtgactt ctttctgttt tattgatggc cattgggtga gtctggagag
97981 atccaagggtg tgttctaaaa ttagatttca actaaattgt aaaaatataca agtttttttc
98041 ccttgagggt atcagctagt gattttcaag gcaaatatta tattccctgc tactattgac
98101 tctggttgta ttttacctgg aaagtctctg attcaaattt gaacctcat ttgttaacat
98161 gcaaaattga agtagattct ctttatagt tttacaatgc catcttttgc ttaagggtta
98221 ttcatttgta tgatgtatcc ctttgattca tctaccacc tgggctagaa attctaagcc
98281 cccatataga aaaaatgcagt atatatattag agtttatgat cagcatattt cttcattatc
98341 aacctcacta atgcagatta tttataaaat atgcaaaagt taagaaaatg gagaaaactg
98401 ctctctgata taataccaaa tcttttagag agtatggaag tttttggcca ggcacggtgg
98461 ctacagcctg taatcccagc actttggaag gccaaaggcag gtggatcacc tgaggtcagg
98521 agttcgagac cagcctggcc aacatggtga aacctgtct ctactaaaaa taaaaaat
98581 agctgggctt ggtggcatgc tctgtaatc ccagtactc gggaggtcga ggcaggagaa
98641 tcgcttgaa ccaggaggca gatgttgag tgagccgaga tcacactact gcactccagc
98701 ctgggtgaca gagtggatgc cgtctcaaaa aaaaaaaaaa aagagagaga gagtatgcaa
98761 gttttaaaa atacgataca tactttggca cttcttctat tgatatctta ggagtctgtg
98821 tactctgtcc ttaaatctag aatggtttgt gactaattca actaataaaa atgctataat
98881 aattctaaag ctaaatcatg aaaagccatg cagtttttct ttaatcactg caatatttac
98941 tcttgagtc ctaagccaca tgtaagtgt ccaactactc tgaggtcaca atgtccaaac
99001 ccacatgcag aggcctatgt caggccctct ggctcattat cccagctgag cccagctttt
99061 acgtcctttt accccaggta ctaaacctat gagccaagaa agcgatattt gacctgtctg
99121 atacggtaga tactagccac atgtcacacg tggcttttta aattcacatt aataaaaatt
99181 aaataagatt aaaagtacag agcctcagta ttaactaacca tatttcaaat gctcactagc
99241 cagctgtgac tattttatag ccaacatata taggggatat ttctatcatt gcctatcatt
99301 gacatttcta tgtatttctc agctccgct tagataagtt cagccctgg tcaactgaat
99361 tgccccagct tgttcataac tttctggcta aaggcttaga cattctggaa caaaaagaag
99421 ccattcctgc tatgtcttga acaaaacctt aacctacaga atctttaagt gaattagtct
99481 attcttgcat tgctataaag aaacacctga aactgggttt ctgtaagagg ttaattggc
99541 tcatggcttc acaggctgta cagggaagcat ggcggcatct gtttctggg aggcctcagg
99601 aaatgtataa agatggcgga aggcaatggg gaaatcagat acatcttcac atggttgag
99661 caggaggaag agaaagatgg gggaggtgac ttacacttcc aaacaacca atcttgtag
99721 aactcactca ctcactattg ccacaccacc accaaggggg aaactgcccc ccataatcca
99781 atcacctccc accaggcccc acctccaaca ttagggttga caattcaata tgagatttg
99841 gcgaggagac aaattcaaac catatcaaca agcacaataa aatggctgtt attttacacc
99901 attgaagttc tgggtgattt tattatgcag caatagagca tcagaataga attatttagc
99961 atatgaatgg tatcaatatt ttgtcatttc taatttccat gtctgtttt cttctctatc
100021 ccaaaataaag gtatccatag catctttatt ttcctcagtg taagggaac ttgtataaat
100081 tttctataat tttttcatat gttgagctga acttaattctt aattctgatg aggtcaaacc
100141 aggaaaggcc aattagtcatt gttctttgtg taatgcaact gctgcatttc cctccaaaag
100201 tagctagtcc aaaatttagt gacattcaaa accaatggag atataatata ggcctaagag
100261 gagtcaaaaga aatgaatgag ttggacagcc caccaaaaga tacaccctag gtaaatccac
100321 aaagaaaact ccatgactaa aagaaaggct aattgtgata ggcaaacatg aaatgcaaac
100381 aaaactgaaa ctgaaataaa caaagggaat ttcaggaaaa tatttatatg tgaaaaaggg
100441 ttattttatt tgtcttattg aatatcttct ttgttccagc cctctaggag gtgggatgaa
100501 gcattaaata caactatttt taaatgccct taataagttg acattctgaa aagatgaact
100561 ctaaacatat aactaataaa atatatatca tacagatata aaatatagtt tataagaagt
100621 tgcaaatata agtagagagg gtcaatagaa agcatgtcag aagaggggtt gaaattttta
100681 ataaggtgct tagggaagga ctcattgaga aggtgatgtc tgaacaaaga cctaaagtag
100741 gtaaaagaaat tatccatggt ttgtctgggt aaagtacatt ccagacacac ggaacagcat
100801 tctcagtggt ctaacattgg atgtacctag tgtgtctgag gaagaacaag gaaagcagt
100861 tgactgttgc ggagatgaga gagtggagacc actaagagtg aagtctcaga aagaagaggc
100921 atgtgcccag aaggcagcac atacagtc aa aagagattat tttagaacgt taatatttaa
100981 cgcctgccct gctgtgtttt gtacttgcgt ggtgcctact gctcctctct tgtggctgat
101041 ttctcccttt tggaatgaga atgtctatcc aatgcctgta caacaactgt atcttggaag
101101 gaaataaatt gttttttatt tcacaggctc atagctggaa ggaacttgac ttccagctctc
101161 aaatgagact ttggacttca gacatttgaa ttgatgcagc aacgtgttaa gaattggggg
101221 actattgttg gtaggaaag attacatttt tttttatgtg agaaggacac gaggtttcag

```


P A T E N T
Docket SEQ-4095-PV

101281	gggaccaagt	cagaatgcta	tggtttgtac	acggtttgg	tgtcccatc	agaactcata
101341	ttgggatttg	atcccccagg	tagtgggtgt	gggaggttga	gcttagtgag	aagtgtttga
101401	gtcatagggt	tggttccctc	atgaatgcct	tggtaccatt	ttcaatgtag	tgagtgaagt
101461	ctcactctca	caagactgaa	tttgttctag	gggaatgagt	tgtttttcat	gagagtgaat
101521	tggtataaag	ccaggatgcc	cctttggttt	attctctctt	cacatgtgcc	cgcttctgct
101581	ttgaccttct	ccaccatggt	ttgacccagc	acaaaagctc	tcagcagaaa	ctaagcagat
101641	gctaattgcca	tgcttcttgt	acagcctgcg	gaacatgaa	ctaaataaac	ctcttttatt
101701	tataaattac	tcagcttcag	gtattccttt	ataccaacac	aaacagacca	agaaattgag
101761	gaataatatt	tataaaatta	tttcagtga	ttaaattaga	taaaatggac	aaattccctg
101821	aaagaaatta	ctgaatcagg	cacacaaaga	aatagaaaat	cttagtgtct	atttttaaaa
101881	attgaattct	taatttaaaa	ccttcacaca	aagcaaggga	tgacctgaat	gtttattttc
101941	atcacatatt	taagaagaaa	aaaataccaa	cctacataaa	tttttcaaca	aagtctcata
102001	aaggttaact	ctgtgagctt	tatttcaaga	aggaaaatgg	gaatctacca	gaatcataag
102061	gacacacaga	tcccaggagg	gggaacatgg	gcaaacagcc	cccatgatgg	caccaggtta
102121	aaaaagtga	tgaagctcca	gtaggtgaga	gaggcagaga	gcctccctct	gtgactcacc
102181	tttccactgg	ggatctgagc	aaccagtgct	tcagagggaa	gagtaccttg	tttctccaaa
102241	ggcctggaga	taacttgag	aaaggcttag	agacattgta	agggaaaagac	actgggaaaa
102301	ggttcaggcc	ttttctcaga	cccaggactg	agagcaggat	accattttta	attcagatgc
102361	cacaaagtca	atcattcttt	ggtaactaag	cagcgtagct	gtgcaggcat	tttagtcttg
102421	ggccagatat	tggagcacct	gcttttagagc	aggggtggga	cctccatggc	cagaattgtg
102481	gggaaaaaaa	accttagcag	caaacactga	aactgtgcta	tcccccatca	caggcctggg
102541	gcaggagggg	agctgctaca	gccagtttat	cctatgtgat	gagacttgca	accaggcagc
102601	ttagctactt	ggaactagtc	tgtgtgtgtc	attgctgggt	acccaccctt	gttcccctgt
102661	gattgtgggt	cagcagactc	tcctccactc	tacctctagg	cagaaatctg	ggcatttgga
102721	tcactcatte	acctggttca	gcagcttcct	ctgctccacc	cttctgtgca	agagatccct
102781	gaataggagg	gcccctctct	cttcatgcct	aggcagatcc	caggattttg	gagcacctgc
102841	tagcaagggt	cagcacctct	aaccacctaa	ccttccttga	cgtaggtcat	gggtcaatgg
102901	ggccctctct	gctccacagc	caggcagaac	tctagatata	tgaagcacc	attcaactgg
102961	ctcagcagcc	tatcctcccc	tacccttctt	gtgcagagat	tttgatgcag	ggaggctctc
103021	tctgctgcat	accctagcat	tcaaaagcacc	tgctcacaca	gactggcaac	ctgtgctgcc
103081	tcacccttcc	cgttcacaga	tccatgtact	gggctgatcc	tctctgtttt	atgcccaggc
103141	aaatatccaa	gcattaaag	cacctgacct	cctagttaag	aagcctgagt	caccctattt
103201	accctgtgca	gaaatcttgg	ttgggtgggg	tggttctctg	tccacaagca	ggcagatttc
103261	caggatttca	gagcccccc	tctcctggat	taagagttta	ggccaatctc	tccaatatcc
103321	ctgtgcaaag	aacttgagc	cgagggggtt	acctagctcc	acccctagac	agaactctgg
103381	tcacttggtg	gccactcagt	agattctccc	tcagtgttgg	tgcttgtgtc	tgccattgga
103441	agacctatag	gtggacctgc	cttgtctggc	cccaccacc	ttgtcccca	caaccccaa
103501	ggctgagcag	ggagtccaca	ccactgtgta	ctccatgagt	cagaccatta	tctgcagcaa
103561	cagagagttt	cttccagtaa	acaaggatca	aatatataac	cacacattg	tccaaaactg
103621	gctcttaact	ataagtcca	tctactggct	tgtaggttga	accgcacagt	ctaataataa
103681	acctgcaacc	tgtaagtcca	taaggctata	gaagctgggc	aaaagaccta	cccagaattc
103741	tctaaagtca	tacctcctaa	ggaggggagg	ggaatggaaa	gggaaagaaa	aaagaacaat
103801	aatattatag	ggaaataaag	aaaaaaatcc	taccttatgg	aaataattac	aaaaattaga
103861	agtgccagta	ttgccagagg	aggaggaaa	agaacaagaa	ttctaccacc	ataaaaaaag
103921	tgaatgtaat	gaaatcaaca	ccatcaaagg	agcacagtac	ctctccagca	atggtcccta
103981	acaaaaacaa	aagctcagat	atgacagata	aaaaattcaa	agtatagatt	gcaagggaagc
104041	tcaatgagat	gcaagacaag	gctgaaaatg	aatacagaga	gatttctaaa	gcaatccagg
104101	aaatgaagga	agacataaac	atcttataaa	gaaatcaatc	agagcttctg	gaattgagaa
104161	acttacttaa	ggaattataa	agtacaattg	aattcatata	aagtacaatc	tctcatagac
104221	tggaccaagc	agaagagttt	cagaccttga	aaactgggtc	tttgaactaa	cccagaaaaa
104281	aaaattaaaa	ataatttaaa	aatatgaata	cagtcttaga	gcaatatggg	attatgtgaa
104341	gcaaccaaac	tcataaaact	ctggcattcc	tgagaaaagaa	ggagaaatag	ttaataacct
104401	ggaaaacata	tttgaggaaa	taatttaaga	aaatttccct	aatcttgcta	gagaggtaga
104461	catacagata	caagaaatca	agaggacacc	tgactgatgc	tataggaaat	gaacatcacc
104521	aaagcatata	gtcgccagac	tatccaagg	ctacactaaa	gaaaaaaatc	ttaaaggcag
104581	ctagagaaaa	agatcagatc	acatacaaa	ggaaccccat	aaggccaagt	atatagctca
104641	gcagaaacct	tacaagccag	gagagattgg	aggcctactt	tcagcattct	ttaaaggaaag
104701	aaaattttcc	aaccaataat	tgatatattcc	atcaaaactaa	cctttataac	tgaaggagaa
104761	ataaaatctt	ttatagacaa	gcaaaagggt	aaggaaattta	ttaccactgg	accagcttta
104821	caagagatcc	ttaaggagg	tctaaacatg	aaaatctgct	acaaaaatag	cacacctaa
104881	cacatagccc	aagaccctat	aaagaacca	cacaatagaa	actacaaagc	acccagctaa

104941	caacttcaaa	atagaatcaa	aacctcacat	agcaatatta	gccttgaatg	taaatggctc
105001	aaataccctc	acttaaaaag	cacagagtg	caaattcaat	aaaaaacaaa	agtcacgggt
105061	ctgctgtctt	caagagaccc	atctcacatg	taatgttact	gttaggctca	aagtaagggt
105121	ttgtagaagg	atctgtaaca	caaatagaaa	agaaaaaag	aaagaatcac	tattcctata
105181	taagataaaa	cagattttta	accaacaaca	gtaaaaaat	gacacagaaa	ggcactacat
105241	aataataaag	tggttcaattc	aacaagaaga	cttaactgcc	ccaaatatac	atgcactcag
105301	cattggagca	ccaagattca	tgaacaagt	acctccaaac	ctataaaaaag	atttagatac
105361	ccactcaata	atattggggg	acttcaacac	cccactgaga	agattggaca	gatcattgag
105421	gcagaaaact	aacaaggaaa	ttctggactc	ttgaaaaaac	gctcaataaa	ttaggcattg
105481	aaggaacata	cctcaaaaata	ataagagcca	tctatgacaa	aactacagct	aacattacac
105541	tgaacatgca	aaaactgaaa	gcattcccct	tgagaactgg	aacaagaaaa	gggtccccac
105601	tcccatcact	cctattcaac	atagtattga	aagtcctagc	caggacaatc	aggcaagaaa
105661	aaaaaaggca	tccaaataga	aaaaataaag	ccatagtcaa	actatatctc	tttgcgtatg
105721	tgaatccata	catacaaaac	cctaaggact	ctgccaaaag	gctcctggca	cagataaaag
105781	acttctgtaa	agtttcagga	tacaaatcaa	ttcacaaaaa	tcagtagcat	ttctatacaa
105841	taaaaatcct	caagctgaga	gccaaatcaa	gaatgcaatc	ccatttacia	tagcctcaaa
105901	aaaaaaaaaa	aaaaaaaaaa	caactaggac	tacagctaac	caaggagggtg	aaagagaact
105961	gtgaaacact	gctgaaagaa	atcatagatg	acacaaacaa	atggaaaagt	attccatgct
106021	catggatagg	aagaatgaat	attgttaaaa	tggtgtgtacg	gccccaaagca	atttcacagat
106081	tcaactctat	tcctatcaag	ctaccaatgt	cattttgcac	agaactagaa	aaaaaaaaact
106141	atttttaaat	tcatataaaa	ccaaaaaaaag	agcccaaata	gcaaaaagcaa	ccctaagcaa
106201	aaagaaaaaa	gccagaggaa	tcacattacc	tgacttcaaa	ctatactata	aagctacagt
106261	aaccaaaca	gcatggtaat	attataaaaa	cagacacata	gaccaatgga	acagaataga
106321	gaaccagaa	ataaagacac	acaactacag	ccatctgatg	tttgacaaaa	ctgacaaaaa
106381	taaaccaatg	ggaaggact	ctgtattcag	taaatgggtg	tggttatct	ggctagccat
106441	aagcaaaaata	attaaactga	acctttacct	ttcaccat	acaaaaatta	actcaggatg
106501	ggctaaaaat	ttaaatgtaa	gactttat	tacaataatc	ctggaagaaa	acttaggaaa
106561	cattctcta	aacattggcc	ttgggaaga	atttatgact	aagtccccaa	aagcaattgc
106621	aacaaaaaac	aaaaattgac	aagtgggacc	taattaaact	aaagaatttc	tgacacatt
106681	gtataaacta	tcaacagagt	aaacagacaa	cctatagaat	gtaagatttg	caaactatgc
106741	atgcaacaag	ggtctaatat	cccaaatcta	taagggaatg	aaacaattga	acaagcagaa
106801	aacaaataac	cccttttaaaa	acgagcaaaa	gacatgaaca	ggcacttttc	aaaagaagac
106861	atacgagcag	ccaacaaata	ttttaaaagg	ctcaacatca	ctaataatta	gagacacgca
106921	aatcaaaaacc	acaaagagat	accatctcac	accagtcaga	atagctacta	tcaaaaagtt
106981	aaaaaaaaaa	aaacagatgc	tagtgaagct	gtggagcaat	gggaacgctt	gtaccctggt
107041	ggtgggcatg	caaattacgt	cagccaactgt	agaaagcagt	ttggagattt	ctcaaaagac
107101	ttaaaataaa	ctaccattca	acctagtcat	cccattactc	agtatgggtg	atgcacgcca
107161	cacttttttg	gtctaatacca	tttttttttt	tttgagacag	agtttctactc	tggtgtcctc
107221	tcactctgtt	cacaagaaaa	taaatcattc	taccagaaag	acacatgtac	tctcaaat
107281	tcattggaac	actattcaca	atagcaagg	catgggaatc	aacctacgtg	cccatcaaca
107341	atggattaca	ggccaggcac	agtggctcat	gcctgtaatc	ccagcacttt	gggaggtcaa
107401	ggtgggcaga	tacctgtggt	cagcagttca	agaccagcct	ggccaacatg	gtgaaactct
107461	gtctctacta	aaaatacaaa	aattagccgg	gcgtcctggc	acctgcctgt	aatccagct
107521	acttgggagg	ctgaggcaga	agaatcgctt	gaacctggga	ggtggaggga	gcagtgagct
107581	gagatcatgt	cactgcactt	cagcctgaga	aacagagtaa	gattctgtct	caaagaaaaa
107641	aaaatggatt	agacaaaaaa	agtgtggtat	atatagacca	tagaatacta	tgtagccatt
107701	aaaaaaaaaa	gaaatcatgt	cctttgcagc	agcacggatg	cagctaaaagg	ccattgtcct
107761	gagtgaatta	atgcagaaac	agaaaaccaa	atactgcatg	tttcaattat	aaataggaac
107821	tatacaattt	taactaacac	tactaagtga	tagaattgag	aattgtacct	ctgactccag
107881	actcagtcct	taactattat	agtgtttttt	gtggggacca	tatgagtgca	gaggtgaaaa
107941	tactgacaga	tattgaaaga	tgctattggg	taataaaact	acaagagagt	tcagagaaat
108001	taatgataaa	aatgatcata	ctactcctct	cacttaccta	acttttaagc	aaaccatttt
108061	gggaggtcct	ttctaaaaag	aaaataaaag	agagaaaaatg	agaatgctca	agtagatagt
108121	actattgaaa	caggttacta	aaaaatgcag	tggtatcacc	aaagaacctg	ttctgacagc
108181	agagaaaaatg	aaattaggct	ttctgtcctt	atactcaagg	ataactgtgc	cttattgcaa
108241	atattttatc	caactgttcc	ataaaatatc	tttgagtttt	gaaagcaaaa	aaagttaaaa
108301	ataattttct	tacaggaaaa	tagttgatta	ttgaacttca	ttaaaagttt	ttaatgtcct
108361	ctctttgaaa	gacactgtaa	agaaaatgaa	atgacaagcc	tctggctggc	agaaaaatatt
108421	tataaaacat	atgtctgata	aagaacttat	attcagaatg	atatgggtctg	gctgtgtccc
108481	cacccaaatc	tcatcttgaa	ttgtagtctc	cataattccc	atgtgttatg	ggagggactc
108541	agtgaggagat	aattgaatga	tgggggtggt	ttccccata	ctgttctcat	ggtagtgaat

P A T E N T
Docket SEQ-4095-PV

108601	aagtctcatg	aaacttgatg	tttttataag	gggtttcccc	tttcgcttgg	ctgtcattct
108661	ctcttctactg	ccaccatgta	agacgtgact	tttgtctctg	ccattattgt	gaggcctttc
108721	cagccatgtg	gaactgtcay	tcaattaaac	ctctttttct	ttataagtta	cccagctctg
108781	agtatgtctt	tatcagcagc	atgaaaatgg	actaatacag	agactatata	aagaacattt
108841	acaactcagt	aataaaaaaca	gaaagcaatg	aatcaagcta	agtagttggc	aaaaggttta
108901	aacaaacatt	tcataaaaaag	aggttgtatg	aatgacccaa	agcatatgaa	aaaatcatca
108961	gcctcactag	ccattaggaa	aatgtgaatt	aaaactatga	tgagatgcca	ttacattctg
109021	actagaatgg	ccaaaataga	aaacaaaaca	gagtacctac	caactgttgg	ccagaatgtg
109081	aaataactga	aacactcgta	tattgctggc	aatagtatga	aatgggtgca	ccactctata
109141	gaactctggc	agttttttct	taagttaaac	atacacttat	catatgattt	gacattttta
109201	ctcataggta	tttactcaag	agtggagaaa	ttgtatatcc	agaagaagag	aaatacatga
109261	atggtgatat	cagtttttatt	tataatggcc	aataattgaa	aaccatttga	atgttccatta
109321	acaggaaga	gaaatttttt	aatgtgggat	atccaacact	actcaggaa	actgctcagg
109381	aacaaactac	tgattaatac	aacaaaacag	aagaacttca	aaaacattat	gctgaggttaa
109441	agaagcctca	catataacaa	tacacactct	ataactgtat	gtgtgtgtgt	gtgtgtgtat
109501	atatggcatc	tatatatcta	tatctataga	tatatagatg	cataaaaattc	tagaaatcaa
109561	aaactctctt	attgtttacca	aaagcagata	agtagttgct	tgggaaaaag	ggctggaggg
109621	gagagggtaa	actgcaaagg	gcaactgacat	tgtggtcaca	caagtgtata	cattgtcaaaa
109681	actctaactg	aaatgtggac	taacatgttg	cattttatta	tatgtaaatt	atacctcaat
109741	aatatttact	ttaaaaggca	taatgtaaaa	tatgtatgta	cacatacata	caataataat
109801	actaaaaaac	cgttatcttt	ttatgtggca	gttactcata	ttaaactttt	taaccctctc
109861	aattctctca	acacatcagt	atagtaatat	tggcaagtcc	aaacttccct	aattctattc
109921	caataaactg	ttctaattat	ctgtagctca	ccatttaaat	aggagtactt	gagataataa
109981	aataattacc	taaatcacc	atctcaatga	atgatttaga	attgaagagc	cattgccaaa
110041	caaaagattg	tagattttaca	attaacatct	aagtatgctg	tagtatatgt	ttttaattta
110101	caatagaatc	tgccaataat	ttcctcaaat	aagtttcaaa	ttcctaataa	tgtagaaata
110161	catgtcataa	atacataata	ttcttaggta	agatgctatt	atagagaaga	atttaaaaaca
110221	tttacactga	ccttcacaa	aaaagaaaacc	aggggaagca	taaaatatct	tttaaacctc
110281	ttgtagactc	ctgtttctgt	ctgcaatatt	caataatctg	tggctctgaat	ggcttatgaa
110341	attgtgagtt	tctcatcgtt	tagcccatac	cttagctgcc	acaaaaagaa	aggcctgtct
110401	taacttagcg	tttcctagaa	tcagaagaaa	ggagtggcct	gaaggagaga	agactccaat
110461	cgtctcacia	agcatgtaga	tcactgtggt	ctgatacagc	tcagaaatcc	atgatatgag
110521	aacacataga	aagaaactag	catagaataa	aaggaatgag	atcacaattt	tcaaggcatt
110581	tgtatggacc	ttggctcctg	ggctctctgt	tcctttgtaa	ttgagttgca	ttttctggag
110641	atgtttctgc	agggagaaaa	ttaacaggag	aaaagagatg	aaggccacag	taaatgggtg
110701	tagactgaac	atagtcatag	tgaatttgac	cgacactgaa	aatgtttcaa	agtcactcat
110761	actgaaatc	caagttgtgt	ttctttcata	tcggtccagc	cagtctttta	tatgcatggt
110821	tatttgtatc	agatttataa	ataagaagac	caaggttcct	agcagtatca	tcagaatcac
110881	tttgtttact	ctccacttca	aatagagaaa	agcagggcta	gagaaactcg	ctattttgag
110941	caaataaaaag	atgctgaaga	ttgtagcaag	ccagagattg	aagtgattag	aaactatcca
111001	gctaaaaatc	ataattctta	atcctgttcc	agacacaaat	atggctagat	aatgcagagc
111061	taaaaaacca	cttactaata	tttcccagat	cagcccaatt	ctggagattg	ccaagataat
111121	gaggagttaa	tcgactgagg	acagctctct	tttactgacc	cagtcaatgc	agttgatcag
111181	tactataaat	ccattgctca	aattcccaat	tatgaattct	gcaattatta	caagagttaa
111241	gatactcggc	agggcacttt	ccatgtcaga	acagagaaa	ttcaatgtct	aatgtcactg
111301	ctgggtattc	actgatctaa	aatgctattc	acatccttga	gtgtccagtg	gagttcttct
111361	tccttctcct	ttttctgctc	cttctttcat	tgttggtcca	acgtcaaagc	agaaatctct
111421	aaagtttgct	gatcgatctt	cacataactg	ttctggtgat	atctttattt	ttcttcaatt
111481	tctctgctga	gccctagcta	agatatttat	gtcttcacca	tgggcagaaa	tatttcatag
111541	atgatttatgc	agcaaaagta	aactcacatt	tgcaaccatg	caaataaaga	tatatctctc
111601	ttcattgttt	tgtacttttt	tgcttgtctc	gagcatagaa	aattagattc	aaccagcttg
111661	agttctgagg	tacaaatatt	ataaaaatct	gattcataga	atatgtagct	aaatgaagct
111721	tttatggcta	atagcatagc	caatgaagct	ttataaaata	tgcaaagact	tacctatgct
111781	atttcaaaaag	agtgctcaat	ttcttgggga	gctaaagctg	gatctggtca	atactgtgac
111841	taaagagaaa	ctcgtttaca	aagcatccat	ctttctcatt	ccctgcctca	tcactactta
111901	gcagtgtcga	ccaccatccc	tccataggca	ccaaatgcct	tcacatttta	tccgcttttc
111961	ccctcatatt	tcctttttta	acttaaaagt	gataaaaaaa	caaattttac	aaaatcagca
112021	acagctacca	aagaaagcag	tactatatta	catcataact	tgcaaaactg	aaaaccaagc
112081	aaagaaatag	atacactagt	tccccttatc	catgaggcct	atgtcccaag	acccccagtg
112141	gatgcctaaa	acagcagata	gtaccaaact	ctatatacaa	tatatTTTTT	tcctgtattc
112201	acctacctat	gataaaagttt	aatttgtaaa	tcaagcacag	taaaagatta	caaaaaatac

P A T E N T
Docket SEQ-4095-PV

112261	taataataaa	atagaacaat	taaaacaata	tactataata	aaagttgcca	ggggttgtgg
112321	ctcatccctg	taatccctagc	aatttgggag	attgaggcgg	gaggaccgct	cgagcccaaa
112381	agtttgagac	cggcctgggc	aacatagggg	gacctgtat	ctaaaataaa	taaaaattaa
112441	aaaaataaaa	agtaaaaaaa	tgtgttaaaa	tatatagtgt	ggtgtctctc	actctctcaa
112501	gataccttac	tgtactgtac	acacctattt	ttggactgtg	gttgaccttg	ggtcactgaa
112561	actgcagata	agcggggact	aatgtgttca	ttgtgaagag	tcaaggttcc	tcaccccgcc
112621	ccactctttc	aaaaactacc	gaaaaaaagt	ggattaccaa	aattctgaaa	acgtggagac
112681	tcaagaaaga	ttgtctaat	caaaatfaat	ataaaataaa	cactttatct	tgattataag
112741	ataataagta	gccattttagc	tagatgaata	caaagctatt	tttatttaaa	aaagatatag
112801	tttgtgaatt	atgaatgttt	gtattttatt	actcatgcaa	tctttattgg	gtgatctaca
112861	gagtactaaa	aaattttacaa	aataattgca	tcatctttaa	tgatttgcaa	gtttcaatta
112921	taacttaaaa	taggtagata	ttttctattt	tgttgttata	atgggtatatt	tgtaagata
112981	gaatagaaaa	tgtctccttt	aacagtttgt	taggtttgta	tatttatgac	ctttaaata
113041	gtagctatgt	ggcatgtggt	cttccatttg	cattcttgac	ccagggctga	agagatcttt
113101	tatacttttt	catttttaggg	tgtctctcct	acctatctag	agaaaagggt	ttggggatgc
113161	cggtcacaca	ttgataatac	cccaaactct	tacaaatagg	cctgaggaa	ggtactgtac
113221	ttgctgtgat	atgaaaaaat	accacagttt	ttagaacttg	tgatataaca	catgacaaag
113281	acatagagaa	tgataacag	gcttgcggtt	ctgagctgca	ttttcctggt	gtgtttccat
113341	aagagaaaa	atttaaaaa	ataaatttaa	tcaaagagat	gtagtctctc	acttctataa
113401	gagaaagaga	atagatgcta	gggagcatca	cagaaaaact	ttttcagcag	tctgaactga
113461	aaaggaaaa	gaggcaaaag	gcaggaagag	gaaacaatga	aaggtttgag	tatgtaaaag
113521	atTTTTtaag	tactgatgg	atgcagtttg	ccaacgttgt	gttaggatat	ttgcagctat
113581	gtTTTTtaag	aatattgaca	tttaattttc	atttctcata	ttgtgcctat	gagaattttg
113641	tattaagatt	tagctaacct	catatcattt	gtttagaat	atttcttttc	tctttttcat
113701	ttttgctgcc	tattattgtt	acataataca	aatatagaac	atttaatgaa	gtttaaatgc
113761	tatagtataa	agtgcacact	aatttaaaag	cctcccatgg	caagaaagag	aactttgtaa
113821	accccataac	accttatttg	ctcctttcta	atcacacccc	ctatcttcat	tccagaagta
113881	acaactatct	gcaattcaaa	tcacgttatt	gttttaacttt	gtatatttta	atttgaatat
113941	gtatccctaa	gcactagctt	ggttttgcct	ggttttggat	tgccatgaa	tggaaataa
114001	ctgtacacaa	tatttttgaa	tttaactatt	tttgatcaat	attatgtttc	taaaaattat
114061	catgttgcat	atagagatag	atcatttatt	caattgctgt	atagtattaa	tggaaatgaa
114121	attcaaaaat	tatctagtct	agtggaaaaca	caaagtgggt	ttattttgag	tttggagact
114181	atgatgatga	tgatgctacg	aacattcttt	aacatgtaac	ttattattga	gtacatgagc
114241	atacatttct	atgatcttga	tctggaacca	ttccgttgcc	tatttcttct	ggtcttgttt
114301	tggcagttac	gactttctag	atatttgtca	gtttcaatta	tttatgtttt	catgtaattt
114361	tgattataat	atcatcttat	taaattttta	ataccaacag	aatatatcct	ttaaattctt
114421	catattattt	gcttttcttt	tcatgattta	tcttaccaga	agtttgccct	ttttgttagt
114481	ctattcaagt	ctgtcttggg	cgatcttttc	agatgtatta	tttttcatta	atttcatctc
114541	ttatatgttt	atttaattat	ttttacttcc	gttgagtatg	tttgctgtta	tattcctggc
114601	atacgttttc	ctcttagaat	ttttcagcat	ttctcacaag	gttttactat	attttattat
114661	acttaatttt	aaatattttc	taaattttatt	gtgatttttc	ttccaccata	gactattttt
114721	aaaatatatg	ttcgagtttc	catttacata	aaattttctc	tgctaaaatt	tatgttatgc
114781	atatatggtc	aatttttgata	aatgttttgt	gtttgctgaa	aataatgtgt	atcctgtagc
114841	tttgggggtg	agtgtttcat	acatccacta	gatctatttg	taatcatgtt	atttaaattc
114901	tatttacctt	ttctgagttt	tgtcttttta	ttctattatt	tcttgagatt	taatgttaaa
114961	ctatctgct	atgagtatag	gtttatctat	gtcttttaga	agtctgtca	acttttactt
115021	tacatatttt	gatgccatgc	tgatgagtg	atagagcgtt	agaattgtag	tatcttcatg
115081	gcaaatataa	cctctactca	catgaggtga	cattatctat	tctaattgtc	ttttccttaa
115141	aatctattta	gcctcacgcc	tgaattccca	gcactttggg	aggccgaggg	gggtggatca
115201	tgaggtcagg	agatcgagac	cagcatggct	aacacatggt	gaaaccaagt	ctctactaaa
115261	actacaaaaa	attagccggg	catggtggca	ggcacctgta	gtcccagcta	ctcgggaggg
115321	agaggcaaga	gaatggcagg	aacctgggag	gtggagcttg	cagtggagcca	agatcacacc
115381	actgcactcc	agtgtgggtg	acaaaggcag	actccgtctc	aaaaaaaaaa	aatctattta
115441	gtatatatta	aaatgattac	attagcttat	ttttgttagt	gttttatggt	gtgatttttc
115501	taaattttac	ttttaacttc	tctttgttat	taggatttag	atatatatct	tgtacatagc
115561	atagaggtcg	taaaatggga	cctagagcta	tatgttaaca	ttttattcct	tgtaggataa
115621	gaaatgtagt	cttgtaggag	tccctctccc	cccttgaagt	tgtatattat	gtaaattttt
115681	ggatcaataa	atatgttggg	aatgacatgt	tgcttcagag	tgagagcatt	tactcaccac
115741	tataagactg	caaattttct	atcttcttgc	cttgacactc	aaacaagggt	caataaacca
115801	tctatcagcc	tggattcttt	tgtgaccact	atgagcacag	gacatgtaac	agaaatcaaa
115861	aacaaaaaaa	aacaacaaaa	acttctccta	cgtggagtc	ctgagctttg	gggatcttgg

115921	tagtacagca	tagactaagc	tatcttggca	agtatgagac	tggcctcttg	aactgggtatg
115981	ttactaaaac	aaaacaccta	acttatgtga	cactggctta	atacttgatt	cattgggcagt
116041	gagtggaag	aaaaaacatt	actgtttact	gtaaaacaag	atagggagtg	gcaaaacatt
116101	cgatagcagt	cacctgtggt	tatgtgggag	gtaaatcaca	tatttgaaag	ttttgtaact
116161	ctagaaaaaa	aatataattg	aatatattaa	tggttcattt	gacaatttaa	aaaattgact
116221	ttagaaaaata	attgcctact	gtctagctaa	atagcaaaaca	gagggagatg	ctctaaaaga
116281	aaatgatatt	tatttgggag	taatatggca	atgagaatac	atgtgccata	gtaaattatg
116341	tgtgtattca	gggacattag	aaaagacaag	gatttctaaa	agaggaagat	tacataattg
116401	ttttgagata	attaaccttg	gatccaagga	tcaggaacaa	gggtgacacc	tgtctaaggt
116461	tagacaagga	ggttctgagc	agatgtcctt	gcagaagtat	ctttttgtgt	agggttgcat
116521	tggcctttgt	gcaatgttgt	tgtttttag	agtcttttct	ggtagctctt	gttataagtc
116581	gtattttacat	taagaactct	cccctcatgg	cttctctccag	ctccatttgt	cagagtttta
116641	acacaagtga	cttcattttg	attctgacaa	ttttatacta	ctttgcaagc	aggaaaaaaa
116701	tatatcagaa	agaagagtct	agaaacttga	gattttgcag	agctggaaga	ggcaactgct
116761	tctcaacact	gaatagtatt	tgagtttcta	agcctgggta	aaactcagcc	atggctgggc
116821	acgggtggctc	acgcctgtaa	tcccagcact	ttgggagggt	aaggcagggtg	catcacaagg
116881	tcaggagatc	gagaccaccc	tggctaacac	ggtgaaaccc	catctctact	attaatacaa
116941	acaattagcc	tggcatggtg	gcgggcacct	gtagtcccag	ctacttggga	ggctgaggca
117001	ggagaatggt	gtgaacccag	gaggcagagc	ttgcagttag	ccaagatcat	gccactgcac
117061	tccagcctgg	gccacagagt	gagactccgt	ctcaaaaaaa	caaaaaacaa	acaaacaaaa
117121	aaactcagcc	ttaagactag	gattatctca	agggtatggt	tgttacatcc	atgttaaaaa
117181	ttctgactag	atttatattta	cagaaaaagg	ttcaactgac	agttactgct	ctttcagttt
117241	gacaaggtaa	tatcaaggca	gagtgattaa	atatctgggt	tcctgaatga	agccttacaa
117301	tgctcaaagt	atctgatatt	aaatccagag	agaaaaagcag	aggggtgaaa	aagcaacaaa
117361	acacagcaaa	tataagaagc	agcagactag	acaaaaactg	tgacttggtt	gcttgatgt
117421	gaagctgaca	ggaattaaagt	agactaaaaa	attgagtttc	ttaaaaaatt	gtgcttctga
117481	aagaaatgcc	aacccaaact	aggtcacacg	tgtaaaagta	tattaaaaatg	gaggccagggt
117541	ctgaagaatc	cctaggcaga	caaaagccagt	taggtctcat	atgaccttaa	aactgattga
117601	tttacaaaag	taagcaaaaa	ttaacttgag	ctatttttta	taaatgccta	tagtaaaaga
117661	aaacagaact	taaaactcaac	caatcaaaga	cagccaacag	gatagccaaa	catttgattg
117721	gttagctata	aagttacctt	atttcatctg	tcctgtcttt	gcttttcttc	tttgtctgtc
117781	ctataaaaagc	atccccatcg	cgttccctcg	gtagagctcc	ggaaccacct	cagtttgagg
117841	ctttccaatt	tatgaaccat	catttgcaaa	taaactttta	aaaaacttta	gtgtgcctta
117901	gttgacctta	ttaacacatg	ttgagctaaa	accctgtatt	agtctgttct	catgttgcta
117961	ataaagacat	acacaagact	aagtaattta	taaaggaaag	aggtttaatg	aactcacagt
118021	tctacatggc	tgaggaggcc	tcacaatcat	ggtggaagac	aaagaaagag	gaaagggaca
118081	tcttacgtgg	cagcagacaa	gagagagttt	gcaaggcaac	tcccctttat	aaaaccatca
118141	gatctcatga	gaattactta	ttcattatca	taagaacaac	atgggaaaga	cccggcccacg
118201	attcagttgc	ctcccactga	gttctctccc	atgacacatg	ggaattactc	gggagccaca
118261	attcaagatg	agatttggtg	ggggacacag	aaaaaccata	tcaaaccctg	ttccagagat
118321	gcagtttaac	atattatgag	acaaatggga	gctcacagac	aatatgagaa	tctcttgaag
118381	attacacttt	ttttcctagt	tctaaaatta	catctttttt	aatgagactt	atatctcttc
118441	cccaactcag	aacatttcct	tgtcttttaag	ggagacctgc	cacagataga	gaaccataga
118501	aaataacagt	aacaaccaca	taaactgtca	tggttagctat	gaaaagagtt	ggtggaagga
118561	atgggctctc	accaagacag	tgaaaaatag	aggtaggtgg	taaacaaata	tgcaaaagga
118621	ccattcagaa	acccaagcaa	actatcattc	tcccattttt	actggtgcta	taaatacctg
118681	aaaaaaagtg	ccacagaaat	ggattagtgt	tatcatcaac	aaatatattt	gagccgggca
118741	cagtggctca	cacctctaatt	cccagcattt	tgggaggcca	aaatgggaag	atatcttgag
118801	cccaggagtt	tgagaccagc	ctgaacaaca	taaaaagacc	acctctctat	aaaataagat
118861	aaaataaaat	aaaataaaat	aaaataaaaa	aaatagctgg	gcatgggtgt	gcacatctgt
118921	agtcccagct	acttagaagg	ctgagatgga	aggattgctt	gagcccgga	ggcccaggct
118981	gcagttagcc	atgcttatgc	cactgccagt	cagcctgggt	gacagtgaga	ctcatatata
119041	tgtatacat	taaatatatg	tatacatggg	tgagactcat	atatacagat	atgtatatat
119101	ttgtacgtat	gagataagct	ggtagaagtg	aggtcattga	agcagatata	ctgttccttg
119161	ccaattaaagt	cagtgatgaa	ttccatagtt	aataccacca	tgaaaatgtc	ctcctctata
119221	cctggcttct	cttcagagag	aaaaattcct	aattttataa	ttttttttat	tttcaactaa
119281	gggagtaata	caataattaa	gggattaaat	atttaattat	tattgtttca	gtactctct
119341	cttgctatgt	ccattaattc	cattgctcat	tggttaattg	ttgttaatta	cattaaaatc
119401	agttctctcg	taggatcatg	tcatattgat	ctttatgaaa	tcagagcaat	catttttcaa
119461	atgattcagc	tggcaatttt	catactaaca	aatattttag	ttttttataa	gagccacagg
119521	tgataacttt	ccatattcaa	aagaataacc	agtgaagtct	agtgttctca	gatgcagtta

P A T E N T
Docket SEQ-4095-PV

119581	cggacagttt	tccttttact	gtttttcactt	gttgcttcac	cctaaacttc	aatttatgta
119641	cacattacag	tccccaatta	ggagactaac	aggatgttga	agaatggcat	tggcaggaca
119701	tttctgaatt	cagtagcagg	aatgaactca	aaaccagcag	tactgagtca	gttcttggtc
119761	tcttctgact	gaattcgtgt	tcattggaaat	gtttctgcaa	gactgagtgg	tcacagtgct
119821	agaaggctcc	tcagggtttg	cctcttcaca	catgtccatt	tcccccttga	ccttctgcca
119881	tgtcaagata	cagctggaaa	gccctcacca	gaagctgagc	agatatcagt	gcctgctttt
119941	ggaacttccc	agcctgcaga	aacattaggt	ctttatagat	tgtccagctt	caatattatg
120001	cagccttaaa	aaggaacaag	atcatgtcct	ttgcagggac	atggatgaag	ctggaagcca
120061	ttatcctcag	caaactaatg	caggaacaga	aaaccaacaa	ccacgtgttc	tcgcttataa
120121	ttgggaggtg	aacaatgaga	tcacatggac	acagggaggg	gaacaacact	tagcgggcat
120181	gttggggcag	gacgggggtg	ggagagcatt	agagaaaaga	gttgatgcat	gctgggctta
120241	atatctaggt	gataggttga	taggtgcagc	aaaccaccat	ggcacacatt	aacctatgta
120301	acaaacctgc	atctcctgca	catgtacccc	agaacttaat	aaataaataa	ataatacatt
120361	tttaaaagat	ccacatgac	aaaaatgcaa	aaaaaaataa	attatccaac	ttcaggtatt
120421	cttttatagc	aacataaaaat	ggactaagac	aaaactctgt	ggtgaaatct	ccaattatatt
120481	gtaagatgaa	gtcgtagaaa	tgggtgaagt	ccaaaaagca	ggttataatc	tataataaca
120541	tttaagactt	ttattaatat	tgacaaagtc	ccctacaaaa	tgcatgcacc	aatgtaagct
120601	ctcactagca	ttaaacgaga	ctgctcgtaa	ctttgcacac	attataattc	tatgtaacaa
120661	tttacaaaag	caaaatgtgg	ccaatttgaa	atgcaaaaata	gagcacttgt	tattcatttt
120721	accatagtag	tataactaaac	ttacgttttt	gtttaaatgt	gaggctgaat	tttttatata
120781	tgataatctg	gttttttaaaa	ttatttttat	cttttttata	aaacagtaaa	agtattaaat
120841	ttttttctac	tgtttatatt	gcaaatagac	tttaaagttt	ttaatctatt	atttaccttt
120901	ctatatattt	tttcttgagg	cattcagaaa	ttcttccagt	catgctatta	aatgcattca
120961	ttttaaatgt	actctgcctt	taatatcatg	tttaaacatg	tcttcccaac	tttcaagatt
121021	acaaaacaat	tcttggtatt	ttctctgttt	gattgtttac	tttttcaatt	ctatatttaa
121081	tcctcttatt	tactttggaa	gaagaagtat	gttacacatt	tgtcttattt	caaattgcaa
121141	tattgttggt	acaatactaa	ttattgcagg	gttaattttt	cttcacatat	ttaaagatgga
121201	aaaattctatc	tcacacaata	tatttgtaaa	caaaaaaaga	tatttataaa	ctctataaatt
121261	tttttgttgc	actggagttt	cctcattctt	tcatgatgtt	attctatgcc	actctttaaa
121321	gagaagtgtt	ggaggacatg	aaagtgagaa	ggatagacat	gtaactattt	gttggacacc
121381	taacttagga	tggacagatt	atattatttt	tatcagcaaa	tgtgaactca	tcagtccttt
121441	ccttaattgac	atgtgcttcc	tcaaattaaa	ggcagtagag	tcttattttg	attttcttgt
121501	aaaagtttta	aagaattgtt	ttcaaatcta	aagtgatagt	acatctaatt	tagtttttct
121561	gtttgtgtgt	agttagaaat	acaattttgt	cccaatatta	aatgacagag	gtctcaatat
121621	cattagtgtg	acagtcctacg	tttttttttt	gttgatttct	aatgccaaat	ctatcacgta
121681	cggaggttcc	tatgtgataa	gaataaacaa	tctgggtctca	ccagaccgtg	ctttagtgtg
121741	atctgctgac	ctattactta	ttatatacat	tttatttctg	tgtcacaacc	ttcattgttt
121801	tgattttttt	aataattttt	ttgagacacg	gtcttgctct	gtctcaaaaa	atattaaaaa
121861	aatttttttt	atcttttttt	tttttttctt	gacagagtct	tgctctgtag	cccaggctgg
121921	agtggctcaa	ttagggtcga	cttcagcctt	gacctcctgg	gctcaaacaa	tcctcctggt
121981	tgattctctg	tgtagctaag	actacagttg	ccactatacc	cagctacttt	tttgatgctt
122041	ttagagacaa	ggtctcactg	tgttgctcaa	gtgggtcttg	aatgccttaa	ctcaagtgat
122101	cttcccactc	cagcctccca	acatgctggg	attacaagta	tgagccacta	aataaataat
122161	ttaaataagt	cttgctatct	actggatacc	cctaccttaa	ttttcttttt	caagaattgt
122221	ctgaattatt	tttgaatact	taattcatgt	gtaatttagg	actgttttgt	caatttgaaa
122281	ataaatttct	ttagatttct	ggttagaatt	atattgaata	tgtgaattaa	tttgagcata
122341	atcaatgtct	ttgaaaatta	atttttgcat	atctatatag	ttcaaatcct	tcactaaagt
122401	attatagtta	tgtaatttca	caatatataa	catcatgaaa	cacttttctg	agacttagtc
122461	ataatcaaaa	tatagttctt	atttgttaata	agaaagggaa	tttttttaat	ttcacatttt
122521	aatggaccag	tgctgggtgaa	taggtgtaat	tttagcccat	atataattgat	attgtactca
122581	gcaagcttat	caaattttgt	ttatttcaaa	agttttcctg	ttgattttta	aattatctag
122641	gtggaattac	tactattagt	atataatttc	tttaaatttc	catccaaatt	tctatgtaac
122701	aatatttttg	tcaaagtgtg	ttagttaaatt	gacctaacga	aattgtcaat	aaacaagtat
122761	ctttgtctta	atcttgatta	aattgaaaagc	tctatgttac	actaataact	atgcttctgt
122821	atttggttag	tagacataca	agttattaaa	tggtgcttct	atttaaaact	ggtttggtga
122881	tttatcttga	ttaggaggtta	aattagatta	aacatttttg	caacatctgt	tgagataatt
122941	ttatgtaaat	taaaaattatt	tactttctag	ttttaaatta	tcttcaaat	cttagaatga
123001	atcttttcat	ttgtaatata	tttttaagta	atattatgag	actaattttac	ttttacactt
123061	tttttttagca	gttttggtgcc	tgtatctaatt	tgccctacctt	ctcattattt	gctgtcctct
123121	actgttttta	ctcactttga	gaataatttt	tttaacttctt	aaaaataatg	agaataaaac
123181	atttaggttc	actgaagtag	tttggaagag	gtaaaaatta	tgacattttt	aaacttagta

P A T E N T
Docket SEQ-4095-PV

123241	aaagtttttt	ataaatccat	ctgaatttga	tatcttgtgt	atattttgat	agtccattca
123301	aaatcttttg	aattgttgat	ttattaaagt	tttttactac	taataataat	ttttgttaac
123361	ctatgctttt	taaaaacttg	gcaatttcaa	ctgagttttt	aaattttgga	ataaaattat
123421	ttagaacttt	gattatataa	agctctgcta	tttagtattt	tctacatttc	atcaattttt
123481	ctgcttctcg	tatttcttga	tcagtaccat	cagacttttg	aatttcctaa	tctttaaaag
123541	atttttggtg	tactaccatt	gtctattata	ttttgatttt	ctattttatt	attcattcat
123601	ttattttatt	actactttga	ttttggttga	catccaaaag	cataattact	gcccttcaga
123661	caaattctaa	cttttccttt	tgctgagctc	atgacttggg	aaatttactt	aaccttgcta
123721	tcccttggtg	ttttgtttgt	ttagtttttg	agacaagggtc	tcacgctgtc	acctggggct
123781	ggagtgcagt	ggtgcatctc	tggctcactg	tagttttgac	ctcgagggtc	caagtgtacc
123841	ttccacctca	gcctccctag	tagctgggac	tacaaaagggtg	caccaccata	cccggctaata
123901	ttttgtattg	tttgtagagg	gcagtggggg	ctcaccatat	tgcccagggt	tgctctgaac
123961	tcttgaactc	aagcatccac	ctgtctttgac	ctcccaatgt	tcggggatta	caggcagggtg
124021	ccacagcacc	ctgtcatgcc	tctgattcct	taaaaaccaa	agggaaatgag	actgttttta
124081	ggaataaata	taaaataaat	agcacaccta	aaccacctag	aacagtacca	tgtactaagt
124141	aagcgcaagg	tacatattag	ctccttctta	acttattcac	ccttctttta	atttttctgt
124201	tgttcatttt	tcttaactga	aggtgaatat	gtgcctcatt	catctggaaa	acttttttat
124261	aaaacatgta	ctaattggata	tggattctta	gcttttagccg	gttttttcat	tttgattgtg
124321	aaaagctttt	tcgttgctga	gttctaaaca	tttatctttt	atgtagaaat	gttcatcttt
124381	ttctcagtta	tagagaatag	ttcaattttc	aaactttttt	gattgattta	acattttact
124441	actttacatt	ctacgtaata	cttattccat	ggaatctggt	ctttgttata	gtgtacatgg
124501	tttagtgtgt	taaatgtttc	atgtgtattt	gaatgtttgt	gtccagattt	ctgtcaagta
124561	cagatttcta	cataaaaagta	ttgaattaat	ttttgctaata	tgcatctcta	aaatattcca
124621	tatcattctt	tcttctgctt	gatattggcag	tttattaagt	gtgtcttaca	tcttatttat
124681	ttgtggattc	ttcagtttct	gtttgtgagg	cttctgcttt	atctatttac	gtaatgcatt
124741	gttaggtatg	tccaaattca	tgattattgc	atcttttcca	tgaatttttt	ctttttcttt
124801	tttttgagac	ggagtctcgc	tctgtcggcc	aggccggact	gcggactgca	gtggcgcaat
124861	ctcggctcac	tgcaagctcc	gcttccgggg	ttcacgccat	tctctgcctc	cagcttccc
124921	agtagctggg	actacaggcg	cccgccaccg	cgcccggtca	attttttgta	tttttagtag
124981	aaacgggggt	tcaccttgtt	agccaggatg	gtctcgatct	cctgacctca	tgattccacc
125041	gcctcggcct	cccaaagtgc	tgggattaca	ggcgtgagcc	accgcgccc	gccctttttt
125101	ttttttttga	gacagagttt	tgctcttggg	gcccaggctg	gagttcaatg	gtgtgactct
125161	ggctcagtg	cacctctgcc	tcccagggtc	aagtaattct	ccttctctcag	tctcctgagt
125221	agctgggatt	acaggcacac	gccaccatgc	acagctaatt	tttttgattt	tttagtagag
125281	atggggggtt	caccacattg	gccaggctgg	tcttgaactc	ctgacctcag	gtgatctgcc
125341	cgcttggccc	tcccaaagtg	ctggaattac	aggcgtgagc	caacatgccc	agccttcgat
125401	gaattgtttt	attcttacta	ctctgtaatc	acctgtcttt	aactgttact	gttgtttact
125461	ttaaatgtta	tgtgattatt	agttataatt	cagttaaaata	tgacaaaata	aaacaagcaa
125521	tgaataatat	gcatgtggaa	gagcatactat	ctttcacata	actaaaaaat	acataggaaa
125581	gtttttgtgg	cacaaaattg	ccaagggaat	agtgtgattc	tatcaccaac	aaatgatagg
125641	ataatagaca	ttaggcataa	gtagcagtta	ctgtgctcat	tagttagtgg	tagattctac
125701	ccattttatt	tctgtcactg	tggttttctg	cttttaggtat	gcctcttgaa	agcagaacat
125761	agtcgtgttt	tgttttctta	tttattctct	gtcttttgat	agatcaagca	aattttatta
125821	aattcatgaa	catttctgat	aacattgaac	ttgcttttac	tgtcttatta	aaattttgct
125881	agttatcact	ctcttttcac	tctttttttg	ctttgagatt	aaagtataaa	gttcttttta
125941	ttcattttct	catctgtttt	tttttttttt	tttttttttg	agacggagtc	tcgctctgtc
126001	gcccaggctg	gagtgcgata	tcagctcacg	gcaagctccg	cctcctgggt	tcacgccatt
126061	ctcctgcctc	agcctcccga	gtagctggga	ctacaggcgc	ctgccaccac	gccagctaa
126121	ttttttgtat	ttttaataga	gacgggggtt	caccgtgtta	gccaggatgg	tctccatctc
126181	ctgacctcat	gattccaccg	cctcggcctc	ccaaagtgct	gggattacag	gcgtgagaca
126241	cggagcccag	cctcatttct	ccatctattc	taagtttcta	tttttatata	acaaatcatt
126301	ccccaatttg	caggcttaaa	acagcagttt	attacttttt	tcctcacgat	tctgtgaatt
126361	gcctggactt	agtggatagt	ctctcattgt	ggtatttcat	gtagttgcca	tcagataaag
126421	gatgggacca	cagtcactcg	aaggctcaaa	tgggatgaac	atctacaatg	atccaactca
126481	atggctgaca	tagggaggat	tccctctttt	tctactgatt	ggaatagttt	cagaaggaat
126541	ggtaccagct	cctccttgta	actctggtag	aattcggctg	tgattccgtc	tggtcctgga
126601	cttttttttg	ttggtaggct	attaattatt	gcctcaattt	cagagcctgt	tagtggtata
126661	ctcagggttg	caaattcttc	ctggttttagt	cttgggaggg	tgtatgtgtc	gagggaatga
126721	tccatttctt	ctagattttc	tagttttatt	gcatagagggt	gtttatagtt	ttctctgatg
126781	gtagtttgta	tttctgtgga	atcagtggtg	atatcccttt	tatcattttt	tgggggggtc
126841	atttgatttt	tctctctttt	cttctttatt	agtccttgcta	ctggtctatc	aattttgttg

P A T E N T
Docket SEQ-4095-PV

126901	atcttttcaa	aaaaaccaac	tcctggattc	atggatttct	tgaagggtgt	tttgtgtctc
126961	tatctccttc	aattctgctc	tgatcttagt	tgtttcttgc	tgctctgctag	cttttgaatg
127021	tggtggagag	cagtttctca	taaaagcttg	tggtattcaac	tgtaaaagtg	gcaatccact
127081	ctgactcccc	tctccactgc	agagagcttt	cttctttcac	ttattaaact	tttgtctcaa
127141	cctcaccttt	ttgtgtccac	actccttaat	tttcttggtc	atgagaccat	gagctcagat
127201	aacaccttag	taataatatc	aatgacccgg	acctgttttg	gtaacaccag	ctctggggcc
127261	aggacacagg	ggcactctca	ggcagaagac	tgaaatctgt	gcaagtggta	tacaaattta
127321	tccttctcata	cacaaatctc	aggccagctc	ctctcttgga	cttctaaaaa	tttacattca
127381	ttgtgatgag	aatcaacatt	tttggttcat	ttcaaaggac	aggctcaagt	tttgccaatg
127441	ctaatatggc	tcagcagaaa	aatgcatgtg	gcttgattta	agaaagcaca	taaaaggatct
127501	acattgactg	ggttttcata	atcacaaaaa	acgaataaat	ttgtatgagt	atctttatat
127561	gaaggcaagg	aggaaaacag	gtgaatggaa	gcctacgtaa	atgtgcttat	gattttaaaac
127621	aaacttattt	cctcaggaaa	aatatatttt	tcacctcacc	tgttaaaagtc	ttaggaaagc
127681	ttaaccttga	taatctccta	ataacagaac	ttatgtttct	tttctgaacc	tcattccttc
127741	tcattattgta	ataatgaaat	gaataaatga	atagcaagtg	agtagtggtg	cacactaaac
127801	tctgagtact	gactgccttc	tattccactt	aataccttta	taagaacatt	gttatgtacc
127861	taagtcatgt	catctataaa	actaaggtaa	tgataacaat	catatgtccc	taataataatg
127921	gttttgatga	ttaagtggaa	catagtaaata	gtttaaaaat	gttttctatt	ataaccaatt
127981	tggtctaggat	aggtggaaag	aatagaaata	tgataattaa	ttgtgaaatg	tataatatat
128041	attaataggt	catcaacatc	aaattaaaaa	atatagatga	ttaccatgat	agtgaacca
128101	aagttttttag	acaagtcaaa	gcaaagttag	agtctcagag	accatttgtg	ttatttgcta
128161	actgtattat	cagactgctt	agttgatata	gtgaatacaa	taattcttcc	aatgtacata
128221	aactggcaga	caagcaactc	aatgcaattc	actcactctc	ggagaagttt	atccccctctg
128281	caaatgttca	tctttcctgg	caaaccatcc	ttcagtattc	caggcaaaact	agagcaaggt
128341	gaagttgaag	aagatcctac	tttatatttc	attcagagag	cttccgggtc	ttcaaaaaag
128401	atttagtcat	gtgggtgtga	aagagctgag	tcattgaaatt	tggaacctat	tgtaagtcca
128461	gaagggaaaa	caaggggttt	gaagcacaag	ggtgatatga	tctaatttct	acttttaaat
128521	gatcactctg	attgtcgtga	gggaactgat	atgggatgta	ctgggggaag	aatgtttacca
128581	ggaccaggtc	gaggctgtta	aagacctcca	ggagagagca	ttgtggggccg	aacaacaagc
128641	ttctagttaa	gatcatgcaa	gtggacacat	ttgagatgta	ttttgaaggt	ggaagaaatt
128701	agataagcta	atgggtagtg	cctggaggga	gtgaggattt	ttgaaccact	aggtaaaccac
128761	ctgtgagtta	cagagaaaaa	gttgggtatg	gttatgaaag	atgaatccta	aaatttccata
128821	tgttgaagac	tgatgcttca	ggacctcaga	atgtgaacat	ccatagtaga	agggaattgt
128881	gttggtgacg	gctgccaccc	actctagggt	cccaagctcc	tcgagcagtc	ctacttctcc
128941	ctttcaccca	cactcactcc	cagacagtg	ccctttcagc	tcttccatca	ccccttcttt
129001	tgatttggtc	ggtgagagca	tagctgggat	ttatactttc	ttgatatgct	agtcctcttt
129061	gctgatgtgt	gacattggag	aaggtcatgg	aagggacctg	agctgagcga	cctttaggag
129121	catttctctg	tcttttctctg	tactctgctg	ccaaggagaa	atctgtcttt	caccaggctt
129181	gcagcttctt	ccgttaccca	catcatcagg	caatatctgt	ctggcaccct	cttttcttcc
129241	ctttctctgg	ccttctcttt	tgacatgatg	gttgacctga	aatcaccaag	gcaggactgc
129301	tcattctccag	gtctaattga	aaacagtatc	tggtgaaacc	aaagaaaaata	atcccagtaa
129361	cccactggga	gctgcttggt	ttaagcacct	accctgtgcc	taagatacaa	cccatcaagc
129421	ccagctaaaa	ctgatccagt	ttccacaggg	ccagagaaga	attgccaaat	aagaatgc
129481	tcctcacttca	aatatgtcta	tatttatttc	agggaaaaata	tcagtctgcc	tggttccctt
129541	atgagaacat	tgttgtctgt	agaaaaatct	aatctattag	gaagccttct	tgttttgtta
129601	tctgcaactc	ttcagaaggg	ccagaccaga	ccctcgtatg	cacagtacag	gatccaccca
129661	tgacatctg	tctagggcct	tgtctttatg	attttctgtc	acatggcctc	tcagccatgc
129721	ctccaaccaa	gctatcctca	aataaacact	agccgtgcac	aaaaagtga	aaattacaca
129781	aggcctacac	aaggtctgaa	atggaaagtg	cagctgggtg	taccgagtag	tataatttat
129841	gaattgagga	acagggaatt	tctagggtatc	acagagcaat	cagcagctga	gaagaggagt
129901	accaatccag	gaccctggaa	ggatttttca	gaaacttaat	agtttattgt	ccaattgtag
129961	agacaaaaat	gaaaaataag	atagtggagg	gtaccataca	ccattgctta	gaagattaaa
130021	taaatgtcat	ctcccacaag	tcatgtgggg	agaaaaaaac	tatataggaa	gaaaaattaca
130081	aacgacaagg	tagtctcagc	atataaaaata	tcaacaaatg	aatgtaagaa	agagaattgag
130141	aaagaattag	tattagaata	tcatagaaaa	aatcatcttt	gtgaaagaaa	actctgatga
130201	aactggtgac	ataaatactg	agtaaaaaac	agaagaccaa	tcaaggcatt	tgaggcttga
130261	acaggcatta	caaatcatca	agttgaatat	ataagtatgg	ccacttagtt	atttagtggtg
130321	aagactacgg	tatttggttag	aagaaaaata	gtagatgatg	aattctatag	aatattctgg
130381	agaaagtggg	ggtcttagct	acatgacatc	gtgtgggtca	ctttgggaac	catgtttcag
130441	tttgtttagg	tctagaaatt	ccttgggtgt	ttctgtgttc	agttttgtct	taataatccc
130501	taaagatatt	ttttaaaaata	caaatttttt	agctttcctg	tattgtacag	caccaacgct

130561	tgctgagtg	tagtgagatt	cacagagttt	ggaaatttcc	tgtagcatga	ggaggctgcy
130621	gggcagcctt	ctgtcatcta	tgtgtaccca	gcagtgtgct	gtcctcacac	aactcacgga
130681	taagcagaaa	gcattctctat	tacatgaaaa	atlttagctaa	atatacaaat	atccatgcac
130741	acacatcatg	agagatggaa	ataggctatc	aaaagagtca	gacatattga	ccgtcttcac
130801	tgttagctgt	aggattgctg	cccaaccccc	tgacacaccc	acacaaactc	acatacacaS
130861	aaatgaaaa	cacagtggaa	agcagaatag	cagtctttcc	aaacagattg	aaaaacaaat
130921	gatgtctaaa	gttcaatcct	gacactgtgc	tgattgcttg	gacacagttc	cgtaaaaaca
130981	tttgtccaag	tcatagtgtg	acctttttaga	aattagccac	aaacaacatc	ctccccaacc
131041	cttcctgcta	ggctagagtc	ccagaagaaa	tgagggatac	acttgacctg	aagtaagcaa
131101	agcagaaccc	agtctctgag	gagaggaggg	ccacctggta	gggagctcaa	atgcgccatt
131161	gtcctgcttg	tctttataaa	gggagctgac	acgtttctcc	cagcataaag	ttgggagtg
131221	caccagagcc	ttctgcaaga	tgcttctgat	tctgctgtca	gtggccctgc	tggccttcag
131281	ctcagctcag	gacttagatg	aaggtaagcc	gaattggggg	aagatattgt	gactctgatt
131341	gggtgttacg	ggcgaatgct	atagaggggg	aaagtggagg	gaagagagga	ggatgagaaa
131401	acagatagga	ctgaagagtt	ctcatgccaa	ggatcagaag	acctgttgtg	ccttcattcc
131461	tcatcaagac	ctcataattt	attgattgca	caaatagaac	ccaataaaga	atttgtaccg
131521	ggggagtgag	agagttagat	ttgcatttat	agagacatgg	gactgctggg	aaggatattg
131581	agaatgcaag	acagattcag	ggaagtgcag	ctgtgaagat	cctatactga	tcccagtaga
131641	cagggatgat	ggtggccttg	ctggacagtg	gatgagtatc	catgaaggag	ataaacacat
131701	gtcagagcta	ttgctgaggg	agagaattgg	gtaaacactt	gcctctgtct	acatagagtt
131761	agagaatcac	cagagtgaag	tattgtcatt	ttttctctc	ctgcatgtag	tattttaatg
131821	tgctgggacg	ggcattttgta	agattgtatc	taagtggcta	tgtctggtgg	ctcctgttga
131881	gaaagcttgc	aaacataaac	aacattttta	cagatgaaa	agggcagaag	gatcccaaaa
131941	tatttcattg	aaataactca	gagcccttta	actaaataag	cactaaggct	taaggatca
132001	tgagaggaca	aacagggggc	cttctatggt	gagttcctgg	ttgacgctca	gtgtagtaac
132061	aatcctgctt	tcccttacat	cttcttccac	ttccggtagc	atcagagagt	ggctgatgag
132121	atctcaaagg	ggatgcacag	ggtgtgatca	gaggtccctt	atcctcgtag	aacactatga
132181	gctctgaatg	attcatgcag	taacttttcc	catcatcctg	tacttctttt	ctagatgtca
132241	gccaagaaga	cgttcccttg	gtaatatcag	gtaaatccca	ataaattctc	agtaaaactc
132301	gtctccattt	ttccctgaaa	aattgatcag	ttctccagtg	tcttcttata	atccttgtca
132361	ggaattggct	aatatcagtg	ccccagagat	ataaacagtt	ttctcccaac	cttgattctg
132421	gggaccatga	gtaaaagaa	ttgatttttc	accaccctaa	tgtaggattaa	gaggagtctt
132481	aattaggaag	ccttgggaa	gggggaggtt	gggagttgag	aggcaggtca	gggagagagg
132541	ggccggccgt	gtggtgaaga	cagagagata	tgaagacagg	aggggtttcc	agcatgagct
132601	cagctcttct	tgtttcaact	cacacagatg	gaggagactc	tgagcagttc	atagatgagg
132661	agcgtcaggg	accacctttg	ggaggacagc	aatctcaacc	ctctgctggt	gatgggaacc
132721	agaatgatgg	ccctcagcag	ggaccacccc	aacaaggagg	ccagcagcaa	caagggtccac
132781	cacctcctca	gggaaagcca	caaggaccac	cccaRcaggg	aggccatccc	cctcctcctc
132841	aaggaaggcc	acaaggacca	ccccaacagg	gaggccatcc	ccgtcctcct	cgaggaaggc
132901	cacaaggacc	acccaacag	ggaggccatc	agcaagggtc	tccccacct	cctcctggaa
132961	agccccagg	accacctccc	caagggggcc	gcccacaagg	acctccacag	gggcagttct
133021	ctcagtaatc	taggattcaa	tgataggtat	gattccagtt	tattatccat	caaaggctcc
133081	aactgctaca	gttctccaac	ttcattgtgc	cagtgaatct	attgaaaagc	tgtaaatatt
133141	tccgtgtcct	ggaacacatt	tctcatgagt	tttgttcaaa	tattctggga	taaggtagca
133201	agatcttggt	tttaaacaa	ctcttgaagg	caattccaat	tttgagaatc	actatcttca
133261	aattacctct	cttaaatagg	gttgggaatg	aggacataga	atcatgttct	ccctttggca
133321	ctctgtttcc	tttctcaca	ctcaaagact	ccattttatt	ttaaagttta	cctgaacact
133381	ccttgttcag	gacaggctca	gtcctgcctc	acactagcat	ttcaagtcca	gtattcctgc
133441	ttaaaggtcc	ttggactttt	agctgttaaa	tggtatctca	ttttttaaaa	cacatttcac
133501	atttaaagtc	atacatgctt	aagctaacaa	aaactaatct	cactgaatag	acatgtacca
133561	agctaaatag	caattcattt	ctcctccctt	ctacccttac	caaaactccc	actttttact
133621	gtttggaaac	tcctctttga	aatattttatt	gctacataac	tatatataat	tttccacca
133681	ctaataccac	acttttatatt	cagttctgtg	tcttacttat	tggaaaaatt	tatttcttag
133741	gttccacatg	agttttattt	gatctcttca	gtgtttatYg	gttagttttt	ttttttacaa
133801	ttatatatga	tgctattggt	tggtttttcc	ataatttact	taaccaatcc	ttgtcactga
133861	acattaaggc	tgctttcaca	ctgtccctat	tacaggatat	gttgacgtcc	ccatctttct
133921	gaaaataacc	cttaacgtat	ccaacagcca	caaagcatga	acaacctaac	aataatcggt
133981	tttctgctct	atctaagcaa				

Following is a genomic nucleotide sequence of a *GRID2* region (SEQ ID NO: 3).

>4:94744101-94841750

```

1      tcaactctcg ggctcaagca atcctccac ctcagcctct aaaataactg ggactaccac
61     ccagtcaaat gccaccacat ttgactaatt tttataaatg tttttagag atagggtttt
121    gatatgttgc ccaaactagt cttgaatttg gggcctcgag tgatcctccc acctcaacct
181    cccaaagcca tgggattcca ggtgtRagcc actgtacctt accctcttct ggaaaaatctt
241    aaRgccttag attgcattcc tgtctttata ggtcatattt ctcattattc tcttcttttt
301    gaccttttct ttgcaacttg agagttttaa aagttcactt atttgttaac ttattcatta
361    gtcctgatat atcatttgca ttctttacta ctcccaactg ttatttttat tctgcagtag
421    aagtttgtct ttattctttt ttgttttctt ttctcatatt atctcatctt ttatatgatt
481    accttctctt cagcctattc tctttgttgg ttctctactg atgtttcacc tagattttca
541    ttgttttaaag gcattcatca gattataatt caacattttt attgaatgca gccagaattt
601    atgtgaggta tgtactacct ctgagacttg agggtagat tctgatttgt ttaggggtgca
661    atgagttttt gtgtttgttt atgtttctat aaacctacca ggcccaatct ttatttttgt
721    caatagttaa agaaagtga gcatcttttg cctcctctac aatccattta gttaaagtca
781    gtttttcttt ctcagacctt gagttaagaa tcaaatagat atgttcagca tttaatcaaa
841    tttaacctgc atagtaggta ttccatgtat aggtttttga cagagattta ctaaagtatt
901    ttggtctaata tatgacagag catttattcc agacactgtc ttgtttatac tacttatcac
961    tcagtgcacta aatcttccaa aacaaaaatt attgtcatct caccctctct acttccataa
1021   ccttacggtg gtttctgctt tgagtagtag tctctggata tttgtgaaag agtgtaactg
1081   agaaggcagc aggtagtga taagagaaca aagtctctgg atactaataa agatagttct
1141   catatagttc aggatagctt gctgcttact tggccataaa gctcttacag cctaaagtta
1201   ggcataatca aaggaaatat tgttgcgga agtcaggac cccaaatgga gggactggct
1261   gaagccatgg cagaagaaca tggattgtga agatttcatg gacatttatt agttcccaa
1321   attaataact ttataatttc ttatgcctgt cttactgca atctctaaac ataatgtga
1381   aagatttcat ggacactaac cacttcccca atcaataccc ttgtgatttc ctatgcctgt
1441   ctttacttta atctcttaat cctgtcagct gaggaggatg tatattgcct caggacctgt
1501   taataattgc attaactgca caaactgtac agcatgtgtg tttgagcaat atgaaatgtg
1561   ggacacctta aaaaagaaca ggataacagc aattgttcag ggaataagag agataacctt
1621   aaactctgac tgcctgtgag cgggtggaa cagagccata tttctcttct ttgaaaagca
1681   aatggggagaa ataagtctga attcttttct tcagcatgga acatccctga gaaagagaat
1741   gcgcacctgt ggataggctc cttaaactggc acccctgggc atggtcatct cttatggtcg
1801   agactgcaga ggtgagatag actccagtct cctatagcac tcccaggctt attaggaaga
1861   ggaattcccc gcctaataaa ttttggtcac actggttgat ctctcaaaac cctgtctcct
1921   gataagatgt tgtcaatgac aatggtgcct gaaacttcat tagcaatttt aatttcacct
1981   gggctcctgt gtctgtgtat cttgccctgc ctccgcttgc cttgtgatag tctattacct
2041   tgtaaagtac ttgatgtctc tgaccacac ctattcacac actccctccc cttttgaaaa
2101   tcctaataaa aaacttactg gtttttgggg cttgtggggc atcatagaac ctaccgacat
2161   gtgatgtcta ccccgagcgc cgggttttaa aatttctctc ttttgtactc tgtcccttta
2221   tttctcaagc tggccgacgc ttaaggaaaa tagaaaagaa cctacatgaa tatcggggca
2281   attccccgat aaaatatatt atataggag actcaaagca tatttctacc tccctgtac
2341   taatttgaaa aagaatatat atggttgata aatatatata tatatttaga ataagtatta
2401   agccccaatg ttatgcatac tcaaaggaat tatacaacat aaagagaatc aaagtattat
2461   tctactYtcc ttggactaat tcgtcctgtt ctggttgtaa gtatgggata tgaataacat
2521   agatgaaatg tatgcttttg aatctatccc caatctcaat ttagttgttt caaattattt
2581   gagaatttct catttatctt tctctaactt gaattatgga gcctgtggct ttattttttt
2641   ttttttaagt tttttttttt ttggtcagtt gttgaaattt ttaaacagat atttgagga
2701   ggtgtatcag agccagctag ttttaagtct cagactggtc actcttaaaa taatcccacc
2761   cagtcatgcc atcatcaaat ttagttgcct ctctccttgg cttaaattta atacattttt
2821   tcccaatctt attggactct ttagaaatgt ttaaacaaa aatgactaat ttatttttta
2881   aatgtaatata atttgttga ttgaataaga atgtttaaaa atgaaacatt attgtgaaaa
2941   ttaccacatc cttggtttta aatagcctga gaaaggaaa cacagccata agaaataaat
3001   atacgaatag gttaatacag aggaaattgt gccagacaaa gctggttgct tttttgatag
3061   ctttacagcc ttagttaaag aacagagtgg agtagacata atgcattctg actctagca
3121   aagtactgga gacaatgtcg tgtgaaattt tgattgcaaa attaatttga gttggcttga
3181   aaaacactgt taaaggaaat ataagctggt tgaagagaca tacagagaag agtgttgatt
3241   aatgtcagtg aactaatgag ttgagtgata tctccagtta aatgtcacga ttgtgagtg
3301   tggattgaat tatttttgtt atctgttgaa aaaataaata acataggggt gattaaatta

```

3361	gagcagaaaa	tttatcagga	gacaccagtg	attacagaaa	atctatataa	agacatgaat
3421	tcattttcaga	gaaaaaccag	tgaaacaata	taatttttact	taaagagtcc	attttttttaa
3481	tcacaaaatg	gaatttctatg	aagtatcaat	gcttaaagac	cttcaaacta	cagaattttct
3541	caaaaactaaY	tggaaaacaa	aattaactat	ctcagtaagg	ctagaacatc	attttaattcc
3601	agttagtagc	tacattttat	ccaaccaat	aaagtgcacg	ttaattctta	cctagaggat
3661	gtgggttaaat	gtataattat	tatttaccag	aaataaaaaa	agtatctaga	aaatcagtaa
3721	cctctagaaa	ctcttgggca	caggagaggg	agaaaactat	ggaaggggaa	gtaattatgt
3781	tcttaactat	gttacattct	taagttacat	tcttaactat	ggggatatag	taagactcta
3841	aataactaaa	gttttttttt	attatacttt	aagtttttagg	gtacatgtgc	acaacatgca
3901	ggtttggttac	atatgtatac	atgtgctatg	ttgggtgtact	gcacccatta	actcatcatt
3961	tacattagat	atatgtccta	atgctatctc	tccccactcc	cacctctccc	cacaacaggc
4021	cccggtgtgt	gatgttcccc	ttcctgtgtc	catgtttatt	ttgaaatata	cagattaaat
4081	gtagtttaagt	aaaacaataa	actttttcaa	tgtaggtttt	ttaatgctaa	tgaaaagcta
4141	gtcagcatgg	ggtaaattag	attaaattag	attaggtaaa	ttggaataag	aatcaaatga
4201	tcacaatcat	aaaaatgggat	tagtcttact	ataagtcaca	cctgcaaaaag	gaagaagata
4261	acctggaaaa	atlttaagag	tcttccactt	tacgaagtcg	tagtgagttg	gcaagtttta
4321	ataattttaa	agaaaacggt	gatttctctc	aaaaagagag	agagaaagtt	ttagttattg
4381	attcaacatg	tatttattga	atacctttaa	tgtgcactat	ttttggtttt	gtgagcagtc
4441	ccaaacgatt	aaaacagagt	gacttgttcc	ctgactatct	taaatatatc	caaactgatt
4501	ggcttaaaac	aacggaaatt	tattctctca	cagtttttga	ggccaaaagt	tcacaagcaa
4561	gggtatcagca	gggctgcact	ccccctaaag	gctttggggg	agaatgattt	tgagcgtttc
4621	agcttctgtt	agctgtcagc	attctttgat	ttgtggcaac	atcactccaa	tctctgcctc
4681	catggccatg	ttgcctcctc	ttctgtctga	caaactctcc	tctaccatag	tcttaaccaa
4741	acagtgtgtca	ttgggttttag	tgcataattca	tgtaacttag	aacactctcc	cctctcaata
4801	cttaacataa	ttatatctgc	aaagatcctt	tttccaaaata	aagcaacggt	tgtttccaaa
4861	ttttaggatt	taatatctct	gggtgacat	gatttaacct	actacaaaag	cattttctaa
4921	caagcagctt	aaaaataggtt	tcttttttct	ttgagacagg	gtcttgctct	gttgtcaagg
4981	ctggagtcca	gtgSaccagtc	atggctcact	gcagcatcac	actcccagtt	tcaagcgatc
5041	tttccacctc	agcctcccaa	gtagttttaga	ggacaggtgc	atgccaccac	acacagctaa
5101	tatttctatt	ttttgtagag	acagggtctc	tctgtgttga	ccaggctggt	ctaaaactcc
5161	tgagatMtag	caatcctcct	gccttgccct	ccYaaactgc	tggtgattaca	ggtataagcc
5221	actgtgccag	gctcaaaaatt	aggtttctat	tgctgcatta	atatatacac	agRgccatct
5281	ctttctcttc	taattatttt	acaaatataa	agagcatctg	taacacaatg	aagctgtttt
5341	ccacttttag	aaaagacagt	tttgaaaatg	tgattaatta	tttgttgtag	gttaggcttc
5401	atcacgtcat	attccagtg	cacattgtct	tcaagatctc	cccagtttgg	cactgaagcc
5461	ttattgactc	tgtctctgaa	agaggcctta	aatgatcccc	cttcttctta	atcctcactg
5521	aaattccctt	aggtaagcc	caatttatcc	aagggtctatg	gtcttctact	tgatgttctg
5581	tttttaatcc	ttgatgctat	ccttctcctt	ccatacaaac	agtagatata	catattttca
5641	aaacacagac	tttcttggtt	tctctactta	aaaatctgtc	tagctttcag	atacataaag
5701	gaaaagcaac	ctggttttta	gagcatgcaa	tgYttcttct	taaattttccg	atccctgtcc
5761	ttgtctgcag	atttatcact	taacattcct	ctccttgctt	cataatacta	cacacacaga
5821	catacacaca	cacaaacaca	cacaaacaca	cacacacaaa	cacacacaaa	cacgcacaca
5881	caggcacaca	cacacacgca	cacacaaaaca	cgcacacaga	gacacacaca	cacacgcaca
5941	cacacacaca	cgcacacaca	gttccttgat	attgcagtca	cacagaattg	ttcactgttt
6001	cttgaaaaata	atcataaact	gcatttgctc	atgttatttt	ttgagatcag	agtgttcttc
6061	cctctttttt	ctgcttttaag	gttttctctt	tttttgca	gctattaaaa	cttgcccaac
6121	tatttatatt	tctctatagt	tttccctgat	ccttacacat	cttcatagct	ccttacatgt
6181	aactctatta	ctgtgtgcat	catatgcat	cgtgtttatt	ttccctgtgt	gatttggttt
6241	ttagactatg	accaccttga	agacagaaat	gggtcttata	tatctttaca	tctcctagtt
6301	gtttgcatgg	ttcttgacac	atagcaaatg	ctcataaact	tctgatgaac	taaattactg
6361	taaattaaag	tcattgatac	atttaaatgg	cacgattttac	ctatatctgt	tttataatca
6421	tagttaacaa	attaagcaaa	atacttctag	gaccaggaac	tcaatatgga	gacactccat
6481	tgtaagagag	aaagatgcat	tgaatcggtt	attcagaaaag	aacttattat	gtcactgtat
6541	gcactgcaca	aaggctaata	atcccaaaat	agaattgtta	aaaaattagg	gttttaagatt
6601	aaaggcaaa	gaaatcatat	ttgttgagac	tattaggggt	gcttgaagta	aactaatgcc
6661	aagtttaagt	aaaaagattc	ctgctatatt	atataattgt	taagcctaag	agaccagcag
6721	gcaccaggtg	cagttacatt	cagatgctca	agcaatgcca	ttagggaaat	gcccagtgtt
6781	agccattact	gtgttctgtt	attccttttt	tttttggttt	gttttccctc	tcaggcagat
6841	tctactcatg	tggtacaag	actattattc	tagatactgt	actcatattt	aacagtctca
6901	gggaaagagt	gaagcctttt	actcaatcgt	tccagaaaat	atctaattgga	tgaaggggag
6961	gctctaactg	gccttcggtg	gaccacttac	atttctttga	accaattact	ctggtcagaa

```

7021 gatgaacatg tctgatcttt caggattaga ttcacatgca aaataatggt acaattcaaa
7081 ctaggaaaaa taaattatat atttttaaga gactggatga aaatactcca tacatcacat
7141 gtgcttttct ttttctgtat attggtatat acataatcac tatttctttt tttttttttt
7201 tttttttttg gagatggagt ctgtgtgtgt tgcccaggct ggagcgcagt ggcatgatct
7261 tggctcactg caacttccgc ctccaagggt caagtgatc ttctgcctca gcctcctgag
7321 tagctgggat tacaggcacc caccaccaca cccggctaatt ttttgtattc ttagtagaga
7381 cggggtttta ccatgttggc caggctgggt tcaaactctt gacctcatga tctgccagcc
7441 tcggcctccc aaagtgtctg gattacaggc gtgagccact gcccctgacc caccactatt
7501 tcttttgtaa ttaaaaagta catatacact ttatattttg atgtagatgt aagaatagcc
7561 tctgcttcaa agacctcatt ataatagtat taaagacaca caagtaaaaca aaggtaacaa
7621 taaaatagta atacatatca aatattaagt atctcaggaa taattattcc ttctaaggaa
7681 tggcaaagaa atttttcaca ccacaaagtt aattttgaat tgggtcttca aggaacataa
7741 caatttgaaa agacagagag gactttccag gaaaatgtaa ctacatatgc acaaagtaca
7801 gtagggatta tagtaaKWac actttttatta ttattctacc tcttctactc attcaatttc
7861 cctgactact acaatgtccc catgttgggt tctcctttct tgtattccaa gatatttgtt
7921 cctgcttttg cttattattc tctacccttt aagcttctca ttgcttctc cttcttttct
7981 ctttttctg ggcctccctc tttgttttta cgatccctgg gaggactcat ttaattgact
8041 cctaaatggt ttctgtgtct ctagtgtctt gtagacatta gaggcacaga aaccattttt
8101 cactgtctat tttccactcg gcatccaaac taattttcca taaacattgc ttccatcatg
8161 gatagtgtct ttaatagcat tggaaatcaga cagatcttaa gcacaatata atagtatata
8221 taccagatac cagttatatg actgtgagaa gatagtaact tctgagagtc tcaactactaa
8281 tgcccaactt gtaagataat tatgaaaata tgtacaacat atgtatcact ctgagcagtg
8341 ctgaccacta gatagatgtg caatatataa gtagataata cttttgtggg tatctatatt
8401 actccttttg ccataacca cagtgaacca tcatgttctt ttttaagctt ggtggtggat
8461 acaggtgttc actttaaaag tctcagcttc agatttcaag tcttcaacct atctcctaag
8521 ctgtcagagg cctttacaat ctttacctac ctcttttatt cagtcttatt tccatcatt
8581 tccccacagg aactatttgc tggcccttta aKttctccct tacctcagaa cttgctaata
8641 tttatcactc ttaaatatat gtttttgcct gtgctgttcc tcaaactaga attttctgc
8701 catcttttgt tatcctctct cttcttttag tttaaatacc ttctgttctc taagtttttt
8761 ttttccagga caacctagaa aaaaatatct ctttagtttc tacagtggca gaaggtaatg
8821 tgatttacca atttaattac ttcatattac aatatagtga ccatttatat cagtgtatag
8881 tacaaaatag tatactgtgg tcttactact gattatctta ttcttattta ttgctctcc
8941 aacaagatgt tatcacccat agacaagaat catattttat atatctttat aacccaaagt
9001 gcctttttaa aattaatgta tcatgtttgt tttcctggaa caggaaactga aatagagagt
9061 atgaatgta ttgtaactga atctttgctg taatagttat cccagcatc cttgctaata
9121 cagagaatga agccttaata cctaaagcag ccactgtRtg tgatttaata acttctctcc
9181 tatgcatctt gacaggtagt ggctatgtgc cattcttggg agaactggga aaatggtcac
9241 tgaatcatc tttgttgttt ctagtcccaa tgagaaatgc cagcYgggaa aggctgtac
9301 agtatgtagc aagtgctttt tgctgaaata ataaaagtat ttgcaaggaa atactgaaa
9361 taagtgtcaa atttccaaag attgatctac actacagaag gcttattagg gtatattgat
9421 actagtatgt gttgtcttaa gtggtacatt gtagtttcca tgccaattct tgggttaaaa
9481 cgcagcatgc atctgttata tgccactttc cacttaaatg cctaagacag gtagattgca
9541 ctgtcaagtt aggtcattat aactccaaca gatgttgtca tgtagatgaa gaaaattcat
9601 tttaaatgat atcatttata aaatgtgttt ttctttgtac ctaaaaaagg caataatatg
9661 tcatattagc tcttcagatt caggttgcaa tcagtatggc atgttttgat taaacacttc
9721 acaatttcaa aatcagtgca ggataatgat ggagcacatg tgaggaaaca gcaatagcag
9781 ggggtgttac agtatcccag ttgtttcaag cttaataaca cttcatgtta tcaatcagtt
9841 acaaagggaat aattggtgga taggctgagg aaatggtaca gtaagaaatt gtacttatc
9901 taaactatag ggatggaagt gcagccaggt caatacttat ttggttagta tattgtaact
9961 aatcatttga gttttgccag ctggtatctt atttttgctt atttgtttaa ccgcttttaa
10021 ataagtatat aattttaaca atttaagtca gttgaaatcc ccccataga gctctctcc
10081 aaatgcatcc ctagtacat tcttctttct ggagattaac cagaaattgg tggtttcatc
10141 ctgtttatat gaatacattc ctagaagata aaatcatatt gtagatattt gtgacaaaat
10201 tttcctcaca actatatgaa agagaacgaa ggaagggtgt tggttaggag ttagctgtca
10261 ttaaaagtgt gtaaattttg cacgttccct acatttattt tccagtaaat tttactagtt
10321 tctttctaatt cagttgggac taaagtcaat cgacctgtct ctgcttcttt caatttcatt
10381 tcccaaaaga attttagtc ttctctatta ttcttaactc tgccttgccc caatacatta
10441 atcaatgctt tgggtaacaa cattagattt gtacagggaa ggaccagggg atggcattcc
10501 aaagcaacac atggaaaggg caagagctga atttcataaa ccgtaaccta atccatcact
10561 gcagctttcc gttgcctcta cccagactgc agccaaacat actctaagct gccactttag
10621 agtatcttta ccttccatgg gagttttctt ttttttccct tttttttttt ttttttgagR

```

10681	cagaatctca	ctctatcgcc	caggctgaag	tgcaagtacag	gatcttgtct	cgctgcaagc
10741	tctgcctccc	gggttcaagt	gattctcctg	cctcagcctc	ccgagtagct	gggattacag
10801	gcactcacca	ccacgcccgg	ctaatttttg	tatttttagt	agagatgggg	tttcaccatg
10861	ttggccaggc	tggtcttgaa	ctcctgacct	cataatctgc	ccacttcatt	ttcccaaagt
10921	gctgggatta	caggtgtgag	ccaccgcgcc	tgccaggag	tttttactg	tgatgttgtg
10981	taggtctctg	gaatgtatgt	ttccctctgc	agtttcccca	gtgttgattt	taagggaaga
11041	agccagagca	cttgctatct	caccatcaca	cttggttgaa	gtgtgagtta	ccatgcaatg
11101	tttaaaacat	gagttacacc	tttttgagg	atgctgtaga	ataccgattt	attttttgtg
11161	tgaaaacaaa	ctctacctca	ggttaatcaa	ataattactg	aagaaaaggt	ttttctttat
11221	tcaaatatct	cagcacatga	atgaagaaga	aatggtaaaa	gtaaaacatg	aacatttggc
11281	catcactaat	tatattagtt	tgtagaggct	actgtaacaa	aattccacag	accaagtggc
11341	tgaacagaca	aaaatttgac	tgaggagtca	aaagcaaggt	gccagtgatg	tgggttttcc
11401	ctgagccctc	tctcttcagc	tgagagctgg	ccaacttttc	cctgtgtcct	aacatggtct
11461	tctttgcacc	cgatggctct	ctttatggtc	taatctcttc	ttcctgtaac	tacaacagtc
11521	tgattagttt	tgggcccacc	catatgatct	cacttaacca	taattatctt	ctttaaagac
11581	cctatcttca	aatgcattgt	gaggtactgg	gggttagggc	gtcaacacct	aaatttgggg
11641	aaacacaatt	cagctcatta	aatgaatgga	agtcataact	gaaatcaatg	acggatcgta
11701	tgactacaaa	aaaaggagac	aaacattata	cacctgctgt	ttaaagtata	caacacaaaa
11761	ttattgacaa	atattaagct	gaattaggct	aatcttctag	atttaccatg	ttgcaataaa
11821	tgcaatccac	agagcaagat	gtggatatgg	gggattcaga	cagcaYaatc	tagctcggga
11881	aactacagaa	aaaaaaaaatg	acccattttg	tgacatataa	ttgaagggaac	aaatgaagat
11941	agatgaatgg	agaaccRta	aataaagcaa	ttcaagatac	acatgaactc	ataaaacata
12001	ggtcctaatt	tgagtaaaga	aagaaaattt	taatactgac	tggtWtattg	atgacactga
12061	gaaactattc	taactgtgca	gctatgaaaa	ggaatgagat	catgtccttt	tcagggacgt
12121	ggatgaagct	ggaagccatt	atcctcagca	aactaacaca	gaaacagaaa	accaaatgcc
12181	acatgttctc	acttataagt	gggagctgaa	caacgagaac	acatggacac	agaaagggga
12241	acaacacaca	ctggggccct	ccccgggggtg	gagtgcagag	agggagagca	ttaggaaaaa
12301	taactaatgc	atactgggct	taatacttgg	gtgatgggtt	gataagtgca	gcaaaacacc
12361	tttgacacaa	tttacctttg	taacaaacct	gcacatcctg	cacatgtacc	tgacacatgaa
12421	ctaaaaataa	aaataaatta	ttctaaatct	tggaaggtat	gataatgggtg	tcattgattat
12481	gttttaaagg	acttcttaac	tttttagagat	atataccaga	atagaaataa	tattgtataa
12541	tgcttgccat	ttgtttcaaa	tcaaatctga	ccaaagtagg	ggcaagaaaag	agttagcgca
12601	taaataaata	actcattgat	aatgagttga	taattgtttc	agtaggatga	tgaatatttg
12661	agttttataat	tttattctat	ttatatattt	gaaaaatttt	atactgaaaa	gttgaaaaag
12721	ctttatattg	gtatttttaa	ctttgtaaat	gtKcactaaa	agaagatatg	tcttttttagt
12781	tgttttgcct	gagttatgat	gagctttgat	gagtcaatca	ggctgcctct	tgagttttcc
12841	ttgtaagggt	aattgggtgc	actggagagc	tagctgaggt	taggagagca	ggctctgggt
12901	gaaggacagg	gtttcggctt	ggcagactaa	ctaccttctc	tgattattaa	actttgatgc
12961	caccacagat	agcacagtat	tctagtcacc	tgtgataacc	tgctcagaag	ttgctctgat
13021	cggtgttcagc	tcaataagtt	tagacttcac	acaatagtgc	ttgtcatttt	ttacctctt
13081	gtaccaaata	tatttcaaaa	tatgtccaat	ccagctgtta	atttgactga	ataaaatatt
13141	ataataacac	ttctgaggat	tgagatgatg	tttgaagttt	ttcaagagtc	ttttccctct
13201	ggattagaga	acatctctgc	cagaatcaaa	atgagttctc	aaattgacag	tttttacttt
13261	acttgctaca	gtaacctggc	attttaaaaa	gcattctgga	aaaaaaaaat	gaatcttctg
13321	attgtgtaat	aaaagaataa	gaatagaaac	taagataaaa	tgattctaca	tgtatatctt
13381	gacttatgtc	tatattttat	aattttcaact	tttacgtcaa	aaaattgtaa	aatgtcacta
13441	atttttataag	gttttaattta	acagatcaaa	gctcatagga	ctttgttgaa	aacaatgaat
13501	gcaaatcctc	agtacagttc	caggtgtgtc	atgagccctc	caaaaaatgat	agttacaatg
13561	actgtttcaa	aaaatttata	ccttcaacaa	aactttaatc	ctattttttat	atgcctgtct
13621	gctctgaaaa	taatttaata	tgtttaaaat	cctagaataa	atcttacttt	aaccataatt
13681	ataattctta	aacttaaaat	tgaatttcaa	tgaatcccca	aaatgggttc	cacataaagt
13741	aatgcagcta	atatcagcac	tgctaacaga	ttacacagaa	aggtctatta	taatgatgta
13801	gtaaatattc	ctgggaaaatc	aacctgttta	aatctatatc	ctataaggaa	aggtgcataat
13861	ctgttttttt	tagtaaaagt	tccgtaatgt	ttattacaag	ttaatcagct	tctcccaggt
13921	tcatttactc	tggtttttat	taattttatta	caggaaatta	ttgggtaagt	aaaccacaat
13981	tataataaaa	tctcatacat	tttattatat	ggttcacaaa	ctttataaac	acctgtgatg
14041	ggattctgct	attgatattt	aagtggatat	ttattaagga	actagagata	cttctcagta
14101	agatttagctt	agagaacggt	cctgtttttg	atctcttaag	attccaaatt	ttttctcaa
14161	attttctgat	attgcccag	tgtcttttct	gaatctatgt	ctttattatt	tggcttaaaa
14221	ccttttgtga	tctggtgctc	tattctgctg	tgactttgga	gaaagggttac	agtttgtttt
14281	tgctgggagg	aataacttct	tgaatgatgt	cccaactgaa	aattattttt	ttgggtggat

```

14341 agaacatccc tgtacaaaac ttctcttatt atcccttgga taattcctgc tgtatataga
14401 ggtccaagat tgattaatga ttttatcttc agtaacctgt gatctaaatt accattggca
14461 agacaagagt gatacctgtt tttttattct ctacattaat aaaacatgcc ttaagaaatc
14521 tatatacttc atatagagga tatgatttgc cactaagcaa actctatgaa aaagaattgt
14581 gttttcatag taaggcttta ttataaaacca aatatgacca actttcagct aaactgtatt
14641 atctaataca gtttattccg tcaactttact tgctattatc aataagacaa gtaatatatt
14701 taaatataga ataagtaaca agcaacatgt taactgaatt aatatattgg taaaatatag
14761 attttaaaag ttttttgaaa atatttgagg agggttgcac ttttgctccc tctgatttta
14821 ctacgtatgt ctctgactgt atgtaatcac acctagctta tgctgtccct tccattctct
14881 acacttgact ttagaaagtc aaacgtagac tggagcaaaa aggggagaga tcttttccta
14941 ccatttagca gattaaaagg tagattggaa atgcatctca gtatctcagc cataaatgtc
15001 taagggataa taatcccgtc acatatattat taaactaatt acaacatatt gcgcaaaata
15061 aaatactttg aatcagaatg acttatgaat ggtcgattgc atacaaaagt gctggagata
15121 tgggtataaa aagatgattc agccatcaca aagctcaaaa ttctactggg agaaacaggt
15181 aaagtgactg aagcccagga taatatttca aataataagt acagtggagt acttatttga
15241 gagatgcaaa ctcaacaaca gtttggttaag tactttctct attctaattt gaatacattc
15301 tagtcaattg agatacacia agcatcaatt ctccccattg gatttggtatc ccaataaact
15361 acccatattcc ccaaatagat agtggtttta ctaaacagac ctcataaaaa gcttgacact
15421 aaaatgagaa tttataaaat gtgatctgta gtaagttaaa tgggtcccaa ccctgcgaaa
15481 aacaaaaaagt atgtccatga actaatccct ggaacatgta aatgtgatca aatagggaaa
15541 agatatcttt gcagatataa ttgtaaagaa tttcaagatg agatYgttat ggaatatctg
15601 agtgggctcc aaatctaatt gcaagtatct ttattagaga aagacatacg gggattttaa
15661 acagaaaaagg aagaggagac agccatgtga aaatggagac agagattgaa gttatgcagc
15721 cacagggtcaa agaattgcttg gaaccaagag aagctggaaa agacaatgaa agattttccc
15781 ctagagcctt tggatagagc cctgcaaaata ctttgatttc atatctgtcc tctggaactt
15841 ggagagaata attttttgat gtttaagcag atgacttttg ggcagtttgt tatggcagcc
15901 attgaaagca agtcgtgac tagtttgccct tattttccaa agcatagata attttcaatt
15961 tcaattagga aaattgaaat tccacaaaat gcaagtgcac acagaaatgt ctatctgagt
16021 tgcagttggg aaacattttg catttaaaaa ggaaaagttt taagataataa aagaaagtct
16081 tgagaaaaaca agagaatatc cctcatatat gtacaacttc ttactaatag aagccttaga
16141 tgtctgatca atttcagagg caaaggctac cattgactgt tcattgacca ttgacaagcc
16201 atgtgtttca atgatgaaat accacataac aaaatactct aaagcatatt gtcttaaac
16261 aactgtttta ttactaaggt tcttgccgat ctgatattca ggcaggattc agtggggata
16321 gcttacctct gttctacatg gcgctcactg gगतगत्ता attagggtaa gaggattgaa
16381 gatgggtatc tttgcatgtc tggggctttg gtctggctg ttggctgagg tgccttagtt
16441 acccttttct ctccacatag cctctaatta ctcaatattc taccagagcc tttaaaaaaa
16501 attttattgt ggtaaaatac acatataaaa tataccatct taaacatttt aagtgtacag
16561 ttcaatgata ataagtacat ttatatctct ttgcatccat catcacccat ctattttcaa
16621 aactcctttc atcatgcaaa actgaaactc tatacttagt aaacaatgat tccccatttc
16681 cctctctgtc cagcccgttg caactgctat tctttctgtt tctatgattt tgaccatttc
16741 aagaaaacta tgttaagtgg aatcataagg tatttgttat tttgtgactg attcatttca
16801 cttagcataa tgtcctcaag gttcatccat gttgtagtat ttctatcctt tgtaaggctg
16861 actgataagg agagacttac ttctgtcatt taaaaacttg ttttctatat ggcttatagc
16921 atttttgtcc cttgcttctt gcgtgactgt cttcttttgt gtttagttga ttattgtaat
16981 gaaatgttta tgtatctatg tcattgactt ttgtatattt tctatagcta ttacatttaa
17041 catcctacag ttataacact cttattttaga ttatgccag ttttaactcca ataatacaca
17101 aaactctctc tttttacatt ccataccac ttcttttggt tgctgatgtc ctaaaactac
17161 acctttacac attgcaggtc caaaaacaaa aactaataat ttttaaatat atcagtttct
17221 tgaattaaac cattgttaca ataatagtag cttttataat tgtccatata cttaccttta
17281 ctgtgatatt tatttcttYa tatatgactt caaattattg tatagtgtat ttttatttcc
17341 atcttcagaa ctcacattaa cgtttcttcc agacaagtct agtgttaca aactcctctc
17401 aacttttgta tacctagaaa tgccttaatg tctcccttag tttgaaggaa atttttgcca
17461 gatataggat tcttgcttga cagggttatt ttctcttagc actttgtata tattggccca
17521 tttctttatg gtttccaaaa ttcttgataa gatatatgct tataatttta tcaaaaatcc
17581 cttgtatgtg attaatcact tctcttttga tgtttttgat attctctttt ttgtcttcat
17641 catttcaaag gttgataatg tggatctctg agctcattgt atttagagtt tactgagctt
17701 cttaaatgtt tataatcata ttctttgtta tatttgggag ttttggccat tatggcttca
17761 aatatcctct cttcttttct ctgtcttctt atggactcca taatgcatct gtttgtccac
17821 ttgatgggtg accaatgggt ccttattctc tgttcacttt tctttaatct ttttctttc
17881 tgttccttgg attgataatt cccatggctc tctctttaca tttgctgagt ctttcttctg
17941 gctgcttaaa tctacctttg aaaaatctct gcaaattttt ttcatttcac ttgtactttt

```

18001	tagctacaaa	atttctttct	acttttaagt	tttctatctc	tttatggacg	tttataattt
18061	attcatgtat	tatttcttga	tttctcttac	tttcttttta	gttcttttgag	catctttatt
18121	acagttggtt	tattacagtt	gtccagtagg	tcccccata	tgtctttttc	agtgacagtt
18181	tctgttggtt	tattttattt	tattttttaa	tgagccattc	tttctgtgtt	ctttggatgc
18241	cttataattt	ttttttgttg	aaaattagac	atgtgactgt	agtaatgtag	taactccggc
18301	aatcagattg	tacttatttc	tcctaggttt	tcctaggaga	aatttcctag	gttttccctt
18361	tttgttctaa	atgttgtaga	ctagactgtc	tctgtgcaaa	ggatcaatct	gagatgtacg
18421	taaatttaag	gtcttctcaa	gtctcttttg	agcctgcacc	tttccctggg	catacacagc
18481	aactttctaa	tttcccggtg	gtatgtggtt	gcttttaaat	gtcttagtat	ttaatgtcta
18541	cctccaaaaa	gaggaaaaga	gaaaaatgaa	gggtggcaagc	aggcactggc	catttaaatc
18601	ccctggaaat	tacttcagcc	agaggggtag	gggtgtgcaa	caatggaggg	gaggtgcaac
18661	aacagtgtac	acctagccct	tcgtctacaa	gtccgtgatt	agaagcagca	gtaagcaatc
18721	agagcacaga	tctccaatat	tttgattata	acattccttt	tgcccatgct	ggcttttggtg
18781	aactgcatgt	aagtgtctcc	tgaacatat	tcatgNctgc	ctgccattgg	actaaggggtc
18841	aggataggta	gctgtctactg	ttttaagagc	ttaaattgat	caaaagtaac	cataattttc
18901	cttataagct	ttccactgga	agtttcaagc	cttcaataga	ctccagaact	ccagaatatt
18961	tatactcagat	agattctgcc	agtgcatgtg	ttgcctacat	ggggagacag	atttctggtg
19021	ctttctattt	tgccagcttc	ccaaaatctt	cctttctaat	cttgttttctc	tccttgaaaag
19081	ctggggagaa	ccagctgtaa	ttctaatttt	tgttggtagt	ggactatggc	tgtgagaaat
19141	gtcctctgga	tggggatgcc	actacccctt	acacagctca	catctcactc	acaactttgg
19201	ttttccctgt	ctctggacca	gccttttttt	atttctttat	ttctttttca	cttgattggc
19261	ttccaaaaat	gagaagagaa	aacctgtgag	atctcttaag	attcatgccca	ccaaatcata
19321	tgtcatcact	tctgccacat	tttactggag	aaaactcaca	gagcaaactc	agattcaaga
19381	aaaggggtcg	tcttagacct	tttgagcttc	tataataaaa	taccttagtt	tgggtaattc
19441	ataaatagta	gtaatttatt	tctcagagtt	ctagaggctg	agaagtcaag	gcatcagcag
19501	attcaatacc	tggtgaaggc	ttgctctctg	cctcgtagac	ggcacatctt	gcagaagggg
19561	tgaacagtat	cctcacatgg	ccaaagggga	aggcaacttc	cttcagttca	ttttataaag
19621	gagctaatcc	tattcatgag	ggaagaacc	tcgtgaatta	atcaccttct	taaatcttta
19681	atacaattga	gttccaacat	atgaattttg	gagcgcaaca	atattagggg	agtggactcc
19741	atctcttgaa	agaagaatgg	tatgtgtgca	cagggatagg	aggaattatc	tgtggccatc
19801	ttgcaggcag	actaccacac	agtgtcttgc	tttttcttat	cattttcttt	gatgacatct
19861	gatcctttct	cacaaatatc	tcctttgtaa	aacactcagc	acttattatt	tatatcagtc
19921	atttgggaat	tagtcatatg	ctgcctagtg	gaatttggtg	tcattaaaaa	tttttctctg
19981	ttttgtcatt	tcaaaaacaa	tcacaaactc	ttggagggtta	aagatgatgt	tctatatttc
20041	cctgtacccc	gtaaaaccag	catagtaggt	atttaataaa	taactgtctt	cttaattata
20101	aatttttaagt	gggtgggagaa	tgatgtattt	acactaatgc	acgggtggtg	tattattatc
20161	cactagattg	tttcttgctg	catatcatgc	actgcattat	ttcttgctgc	atatcaatca
20221	cttagtactg	acctctcttt	taaaatacgc	ctgactttct	catgcttatc	ttacatatat
20281	gggttatagct	aagagtgtg	aatggacaca	gatatgggaa	gcatatttag	gaggattaac
20341	aaaagagtaa	ttagaagaac	acataaatcc	acaaggaaaa	aatgactctt	tttgaagtat
20401	gctagcattt	tcaacatgcc	tgttgagtta	atgatttatg	ggagtttcaa	ttgtttaaat
20461	gtttggaata	ctctgcaata	aaataaaaaa	tctcttcaaa	gttgataaaa	atactcagag
20521	gcatacttcc	tcactctgatg	attcatagtt	accaatgaaa	cccaagaact	ccatgcacat
20581	tttcagcaag	agcaaggcat	ctgatagcaa	gagagctgga	aaggaagaat	catacagtga
20641	cctagacaag	tgtcatgtcg	gtccttagcat	cagataaact	gattgcaatg	gttgattgta
20701	ctatctctag	cgagagtaat	ttagaaaacc	tgaataagaa	accctctctt	gttcatcata
20761	gggatgactc	ttggtgtgaa	cccaatcata	ttaaacaatt	gtagaatcac	caagttagac
20821	attttatgag	actaactgat	ttattcctca	tcttgaaata	aaacctgcat	gccacaaaac
20881	tcctctatgc	tgctgagact	tagttctttc	tttgagaaaa	ataagagcca	tttattcatg
20941	caataaattt	tcattgtgtg	tgaattgtat	actaggcctg	ttccatgtgc	ttgccatacg
21001	tcagtgaata	gaagaggcaa	agatctttgc	ctatggaaact	tgcatgtctag	taggggacat
21061	aagttatttc	gtaagcttcc	cctttataaa	tatcattaat	ccttactaat	aataatactt
21121	acatcaatgt	ttatatattt	tacattggtt	ttctgataat	ataaaaaaaa	attcacaaaa
21181	taaaacccaac	cactaataag	ctgtgtggtt	tgagtgtaga	attcttttca	ttaaacaaac
21241	atttcatttt	cagatcgaga	aactaagggt	tttaaaaaac	tgattttact	gaaaataaaa
21301	tctaaccacc	catcctaagt	ttctttactt	ctttatctgt	ctttcaaaaa	tatcttctct
21361	tctctatggt	gagttagata	tgtattcaca	aaatctacca	tactgtccat	atatgttaga
21421	tataaatttt	tgagctcatg	tgaagaaaac	caagtttgaa	tagttgaagc	aaaacagaag
21481	ggtttattat	taaaaaaaa	atgtgttttc	tcaaggacc	caaaacacaa	agctgaactt
21541	gagaagttag	cgctcaaaac	tattaaggct	gtctgcatga	cccttgctct	aattcctctc
21601	tgaaatagtg	tctcattgat	tgaagtaaaa	aatgacagca	gtttctagag	ctacactgcc

21661	tgtgttcaaa	tcctagctat	gtcatttgtt	agctgagtag	cctggaacag	gtaaattaat
21721	ccctctaatt	ctcaatttcc	acatctgtta	aaattagcat	aattataatc	atatcaggat
21781	aattctgaca	ggattatagc	aaaaaaagat	taaataatat	ctaattgactg	gcacaataacc
21841	tgcttcataa	atataagtct	tcagtaataa	ttaaccacca	ttattaaata	ggagatgtta
21901	agaattgcag	tgagctgggg	agggtgagc	tgccagatgt	gggagtattc	agtaagacaa
21961	caagccaaaa	tgaaagtaac	gattaagctt	ttattccact	tactgtgata	gtataatcaa
22021	gagtcacaga	agaaagtgcc	agcttcacct	gtgtttcatt	ttccctacaa	atggcaccac
22081	gcaaggggtc	gatgcattag	tacagttttg	gataactgtc	ttactgtctc	gggaacccca
22141	aacaaaaagt	tcctatgggt	ttatggacct	aagggcagga	gaagaagcaa	ggggaagatc
22201	taggaatggg	aaagtaccaa	gtactaaagc	agaatggaga	aaagtgtcct	ccaggggtacc
22261	cactcctccc	aacaagcagg	tcttggcaga	ggctcctgga	aaggttcac	tcagagtccc
22321	cagtaagaa	gcctctgaat	ggaggctcct	gggctaagaa	tgcaaatatg	tataaaacat
22381	ggctggccag	gggtcctaag	tccttgactg	caactcccg	cagacactgc	agcacattgt
22441	ctgtgcaagt	cagtttgggg	agggaagctt	tcctctgtga	aggcctccca	ggcaagccct
22501	ttgtattgcc	tagggcaggg	caaaatcata	cagagggttt	tgacttgagg	ctggattcct
22561	tgagaggatt	tctaggagaa	atcctcccaa	aagtttcaac	agtttatatt	tcatttgtat
22621	gttgggtggt	ctcttccaag	tgagataata	tatagatgaa	aagtatctaa	catagattag
22681	gtattactct	tattattact	atagctatgg	ttgcttgtat	ataactgttc	agattatagc
22741	tccaataaaa	caacttattt	tattctctcc	agagtttagt	aatatcatta	ttcctcatac
22801	tgaaggcttt	tgaaaaatgt	tccttggtct	ttactataca	gagtttaacc	tttctgtctc
22861	caggaagaaa	gacagttgga	aattcaccat	ctaaatttaa	aagggggaaa	aatctcagct
22921	gatagctggt	aacacagtg	tggctatgta	ttgagatact	tacttaaagc	atcatataag
22981	aaatgatgta	caggccaggc	gctgtgtgtg	atgcttgtta	tcccagcact	ttgggaggcc
23041	aaggtgggtg	gatcacctga	ggtcaggagt	ttgagaccag	cttgcccaac	acagtggaa
23101	ccctctctta	ctaaaaatac	aaaaattagc	caggtatggt	ggtgtgtgcc	tgtaattcca
23161	actactcggc	aggctgaggg	aagagaatcg	ctgaacctg	ggaggccgag	gccgaagtga
23221	gccgagataa	tgccactgca	ctccagctcg	ggcaacagag	caagactctg	tctcaaaaaa
23281	aaaaaataaa	agaaagaaat	gatgtacaat	cactttaatg	tgatataagg	ttcttggttt
23341	aaaatcatct	aaatttgttt	agtatccaat	aaaaattgaa	gtctcacttt	gtgccaataa
23401	ttatgtattt	aataaatggg	aagaggaaac	aaaacagtaa	tttttcttga	acacgtggaa
23461	atttatagat	aattgtctga	ataaatatta	tcatacaaaa	tatatattta	aaaaacttaa
23521	ctcaaatatt	actgtaaaag	agaggaacat	gattctatat	tacagtgtat	tgaggtagcc
23581	tggtgtgggg	gcaggagatc	aaggagagtt	taccccaaac	tacaggtgtt	tattttgaga
23641	tctaaaggat	gaggaaaaa	tactttacta	atccattaaa	gaattgcagg	tgcttctaaga
23701	ttgttcaggt	caaggaaaac	tgatatattca	aaaccactga	ttctcacatt	tggtcttact
23761	ttggaatcat	cttcataact	ttacacaata	ctgatgccta	gatttcatgc	ccagattctg
23821	atttcattgg	catgggggtg	ggctttgtgt	tcgggatctt	ttttataaac	tcccctagcg
23881	gttctgataa	gcttttagtca	gtgctttaga	aacaatgttt	aaattttcaa	ggtaggaggg
23941	ttatgcctta	ctcaagaaac	cgtaggaaga	ctcatatgat	ttgaattcaa	agaatgagag
24001	ggaaggcatt	atgacatgaa	tygatgaata	taaataataa	caaatcatgc	aaattctggt
24061	aggccacatc	caaagtgttg	cctttatctt	gagaataactg	gaaaactatg	gaaagacttt
24121	aagcagatgt	tataatctca	gaatttatgt	ttgcaaagaa	agactgtaaa	gagaagctat
24181	gaaattagct	tcggctagga	tggttaggaag	gaacgagtta	aatagattca	ggagacattt
24241	ttaaagaggt	gaaattggca	gagctgggca	aaggattgga	tctgagaggt	ggtgagactg
24301	acagcttgat	ttttggctag	tgggactgag	ctgatagtag	ggatagatag	tgagcttaat
24361	cttagagata	tctgagctcc	ctttgaggtg	tctaagcaga	gacagtgaag	tgatagtga
24421	atataaggag	attgctgagc	ttgagatttt	tattgttttag	gagtaaaagt	ctaaattgca
24481	atagagatgc	tttactactaa	ccttgctcagt	ttcataaaaa	ttactttact	ggtacaaaac
24541	atggtaaaa	gcactgtaat	agacagaaaa	atgattcaga	tggtacccat	gaccttaagt
24601	ggttaattat	ttaatggagg	agataggaaa	gacagtgaga	atttaattgtg	attttaaaat
24661	gaacatctta	aaatgtctca	aggtagaatg	gaatagaaga	gaagaaaatc	cagcaacttt
24721	tatcagggtg	taataattaa	atgctaaaa	attattagaa	aaaataataa	tattgtgatc
24781	tgatagaaaa	ggaaagctaa	tagaatttga	gggaggggaa	tgaccccgaa	gaatcatgaa
24841	aactctcagg	gatacaacat	catattagga	cacgggtgtc	agttggaaac	attttgtttt
24901	ttcattcagc	ttgaaactgga	gaaccaaaaa	gaaagaagaa	taaagaggac	agcaggagtt
24961	ttaaatcatg	gatttgttta	ttcaaatctg	ccaYgtacca	atacaacaat	actatgtata
25021	gagctaggag	tacaactgtg	gacaaggtag	tcattcattct	ggcacatagt	ttatagtttc
25081	atatcatatt	tattataaaa	aatagtttac	ttgagacaat	atccctagtt	agctttcaca
25141	aaggaacca	gtcaaaaata	tgactttatt	aaaagaggtt	aagtagccat	tctatgagtt
25201	tgcatccct	gtgtgttgaa	gcaagttttt	ttttttcttt	ttttttcttt	tttttgagac
25261	agtcttgctc	tgttgcctag	gctggagtg	agtggcacc	tcggctcacg	gcaacctcca

25321	tctcccaggt	tcaagcaatt	ctcccgctc	agcccccaa	gtagctggga	ttacaggcat
25381	gtgccaccac	acctggctga	ttttgtatt	tttagtagag	acggggtttc	accatgttgg
25441	ccaggctggt	cttgaactcc	tgaccttagg	tgatctaccc	gccttggcct	cccaaagtgt
25501	tgggactaca	ggcgtgagcc	accgcaccca	gcctgaagca	agtttttaggg	cagtggtttt
25561	caaccttggc	tatacattgg	aattacctgg	aaaggctttt	aaactactga	tgacctgggt
25621	atactcctgg	ggattctgac	ttaattgtcc	tggggtttgg	atggagcatc	agaatttttt
25681	aaagctttcc	attctaatag	tcaacaaaat	attctaatag	tcaacaaaag	ttgaaagcca
25741	cagttttaag	ggcatgtttt	atcactcaga	ctactaagtc	acccgaaaaa	tgagactgag
25801	caaggaacaa	aagaattctg	attatatagg	aaaaataata	acaaacattt	ctttagtctc
25861	agtgtgtcat	gaacacttct	aaacacttaa	catattttta	atcagttagt	gggtcccaaaa
25921	actgtatgag	gaagtcactt	ttactattcg	catttgagag	atgagaaaaa	tgaaacccaa
25981	cagcacacgc	aaagtaagtg	ttagaacagg	tacttgaact	caatcagtc	tcttctagag
26041	cttcttatct	gaactgggtat	gctataattg	ctctaaatgt	agtgtaatgg	taattttata
26101	ccagaagaat	tataaaagaa	aggaaaacct	ataaaaatag	gatatcatta	aatcagttta
26161	atgctagtgg	ataatagagt	gattattatg	actgcataaa	acatctatgg	gttatacata
26221	tgtgtatata	gacatatata	tgtatatatt	tattcaaata	tgtctatata	tagatatatg
26281	tatacatatt	tgtatatata	tgtgtgtgta	tatatatgct	ggttctcatg	ttttcttcat
26341	ttgtaggaat	cagttaacaa	gttcttggtt	catagtatga	aggttctggt	ttcagtagtg
26401	aaacagggag	ataaaagtgg	ttgaaccatg	tgattttttt	tctgactttt	caaagacatt
26461	ttctcctgaa	ggaagctcaa	gtgctaagcg	tattccacat	aatctcaaga	acgactacta
26521	ctttatagta	atgaccaaac	tgtagtaata	gaatcttagg	agcatataat	catcctctag
26581	ggaacacatt	ttacaaattg	aacctatctt	gcagggtgaa	ataccataaa	gaaaatKatc
26641	attggagaga	ttactggcac	actgcattca	ttcacatgtc	aaagtggaaa	acattccaat
26701	ttacttctat	aaaacatgta	tctgagtcaa	cctgccatat	gtatttttta	cactttctat
26761	ccccttacag	aatatctacc	aaataaatgc	tgacacattc	taagtggctg	gcttttaagc
26821	tgctttgcct	atggcttttt	gttccctctt	tttctcagct	gagaaatcaa	gtaaacaaaa
26881	cattgtggct	ggtagcatag	gtcctcagtg	cagtggatat	tttgtgtccg	gcagctggag
26941	catctggctg	acagatgggc	ttcatttgtt	ccatatgaat	acaagttaat	aatgtggagag
27001	aattccattt	ggtattcaat	taagatctcc	cctgactcct	gttattaaag	cctacaaact
27061	attgagcata	aaattaaaaa	cgagcagttc	agctcttttt	gacattataa	cactgcctga
27121	aaaataatgt	aaaacccaag	agtcacaagt	cattccttac	agcccatggc	aaataagaag
27181	tggaaacatt	gaggaagaaa	gagtaaatat	ttaaaacttg	atcattagta	cacatgttag
27241	gagcaggcta	ctgtgctcat	gcaaatacat	caatccagtt	tgttgaacac	aagatattac
27301	attaatttta	acagaatggt	acaagattat	tattggccaa	gctccaatga	aggaaataat
27361	taaaagcata	ggcattttta	ggtcttataa	tgacagaaaa	tactatagga	aatcaataac
27421	cagaaaaata	tatagaaaat	caatatactg	taattgaaag	gaaattgaat	tgggtttact
27481	ttttttatcc	cgtctaaatt	ttcttcagat	tgccagacca	ctgaagatag	tgaatcttgt
27541	tttgccatca	gcagtgtgac	tttctctaag	tctcatgtgc	tgcaagggcc	atctttatgt
27601	ttttttatct	aggaagcact	cagctgaata	gacaStatga	gattttgtgt	gtgtgttctc
27661	tttactagtc	ttggactcat	tgtaaaaaaa	aacagaaaca	aaatcaaaga	cacagcagac
27721	aaaaacaacc	acctccacat	aaccagagaa	gtcaaatata	tgagaattca	gacatcgaaa
27781	ccagaggact	tgtagataaa	gcctcacact	tgaacctaa	tgaaattctt	ctagttttta
27841	tcaaacacta	tgctgtcat	tcttgcctatg	caataagaaa	cattaccagt	tgcatagata
27901	aattcaattt	gaatctatat	gaatctaact	cattttcatt	gcttattatt	ttaaaaagtt
27961	attataatca	aacaaaaaag	cttgaatga	acctcaggga	ggtaagtggg	tatgaacaga
28021	aattaaagaa	tgtaaaatg	agaaatccag	actgggtgct	gtggcttaaa	cctataatcc
28081	cagcattttg	ggaggctgag	gtgggagaat	cccttgagcc	caggagtata	aaacaaaaa
28141	cttaacaatt	ctgagtctca	atgtcgttga	ctataaagta	gaaatatctt	cccttcttac
28201	cttaaataga	tcacatttat	gaaaaagatt	cataagttat	aaaacaacac	ctcaatgaaa
28261	aatgctgtat	ctggacttta	aaaagaagtg	aattaaatac	taattttacc	tcttagtata
28321	tatgtgatct	taatgaagtc	cttagttttc	ttgtctgtta	aataataatg	gtaagggcac
28381	cttctcatat	ggctcattgtg	aagcttacat	gtataaaaa	ctcagtacca	tggctgacac
28441	atagaaagta	tttaacagtg	ttcaaaaaa	taatcaatat	aggaaataag	tattatttta
28501	tttctttaat	aatttcttag	ttatcccca	ttatcatatg	tgataagaga	atgtacttta
28561	tttctagttt	tccagataat	ctgtatccta	aacattcttt	actcccaaat	tcagtccttg
28621	agcatcctaa	ctcttgacat	ccacagctaa	tatttaggaa	acattaaaaa	ttgtttgtac
28681	atttgaagga	agaactaagt	aaatggaact	taccaatcct	aaaatccaga	ctgctgttat
28741	taagaagaag	aacaactgta	caaatgctgt	taYcaaagga	tgtatgagtc	agggcgaaaa
28801	aaaaggagaa	cacagaaagg	tgaaaagtct	ttgtcaagca	gaggagagaa	attattgtct
28861	tgtaatatat	atgagagagt	ctagccaaat	attaaacatt	tttaaaatga	aaagaaatat
28921	tatacatggg	atgaataata	tttaagtcat	tgccatagggt	agaagattag	atatattttac

28981	ctattctacc	tacttcaa	gctttttg	tgctattgt	tggaacctcc	aaatactaga
29041	atgcttttaga	attataaaac	cattgaccat	gttcagttat	gtttaaaaga	aaacatcatt
29101	ctgaggaaac	tggaatttat	atattttataa	atgtttgtcc	atagcattgt	tgaacaaaat
29161	ggctcaggtt	tcactgttaa	tccagttgct	gatatttttg	actactcaat	acacccaaaat
29221	ggtacagttc	agttggtgct	aatagatgtc	atttatttac	acaaactgac	aataggttca
29281	ccaaagttaa	gagacgaatt	taagggggac	agaaaagaaa	ttcctgtgtg	tgctttggca
29341	gcttagacat	acttaccacg	aacaagatta	tatcttaaaa	gctattcggt	aagcttaaaa
29401	ttaagttata	tggttgtaat	atgtggagaW	agcacattgg	aatagctctt	cacttaattgt
29461	tatagatcac	tttttccacc	aatattattt	ggtctaggaa	agtaaaatcc	ctttagggaa
29521	gtaattagaa	aaagcacaca	tcaggggaatg	taattgaaga	tagacttttg	ttgacctcag
29581	aagagaaaag	ctcaaaagaa	atttcgtaaa	gttttaaaata	tggaagagg	accacaatgt
29641	ctttgataat	tagactttca	acacatttgg	atttgctaata	tggtactaag	ttctaatttag
29701	gcttttttatg	taactaagaa	tgacatatca	ttgtatgaat	ttaatgtgct	ttacagttg
29761	aaactaacia	ttagcagcct	tttccaaatt	attttaataa	ggaaaaagct	ggctctgctg
29821	tttatactgt	gacattccct	tctcttaaga	tattattatgt	acattttcat	tttctWaatt
29881	aaacaccttt	tggtggagctt	aaagggaaac	ttgggtttta	ataggaagca	cctaaattgt
29941	ttatttgggtg	gggagacttg	ccagccagta	tgtagatgac	tttggagact	acagacaaac
30001	cgcaataaaa	agaaataaat	cacaatcatc	aggaggaaac	agcacaataa	accatttggc
30061	cctatgacca	ttcagttaat	caaaacagtc	tctgaatatg	atgaagatc	tgttacattt
30121	ttaaagtgtgc	acatgcggaa	tatgttccca	aatgtgaagg	ctcatggatc	tgctttcagg
30181	atgaataata	ggaaatttct	tctcaagatg	tgcatataca	cattctctct	ctctgtagcc
30241	ttgttctgta	aacagttatc	tgctaattca	agtcaaatca	tctctttctt	tctccatatt
30301	tttgattgag	agtcatcaat	ttttatccca	ttcagatata	tagacagtaa	tttaaaaact
30361	ggtRgccctc	agatttgtac	attccaagag	ataagacctc	tataacagca	taaaatttaa
30421	ctactatttg	ggtgagtaaa	gagcagttgag	tcattgcaag	actttaaggg	aaaggctgct
30481	gccaaaatat	tccaagcaaa	ttgataacac	tgccaaaaag	gcaaatata	ttgttttatg
30541	tgctatgaat	actttgaaaa	caaagacata	cacatgattt	ttttcaaaata	aaagcagttg
30601	cccttctaac	catatttaaaa	atagtgtctt	ttttccagct	aaaagccata	taagatcaaa
30661	ttaaaacat	tgaactattt	agagaatcta	acttacagta	attgatata	taaaaaagac
30721	attatgttag	agttatatgt	gctattattt	ttccaattag	tacattactg	ggactgagtg
30781	attggtgtat	acataagtc	tcattaagta	aaatgtctc	aatgagcctc	ctaaagcaca
30841	ttgggtactg	tcagtgtgcca	tataatgata	tttaagagca	agaaatggca	tatctaataa
30901	cttcatttcc	tatttaaaaa	gaaaacctgt	gcagtactct	ttccatacca	attattctaa
30961	gagctatcac	atagtctctc	ataaagacta	tacagagggtg	atgggactgt	tcttcaggca
31021	gaaaaatgac	caaagttgtc	ttatctttca	gcttggKtgc	tggaatcctg	tcacaggtct
31081	gaatgggtca	ctgactgaca	agaaattgga	gaataacatg	cgtggagttg	ttctacgtgt
31141	agtaactgtt	ctggttaagta	ttatctgagc	ctcgtgggtt	tgacttttgg	aggttacttt
31201	atcctatatt	tctttcttta	tttaactgatg	acataatctt	aaaagagatt	ttacaaaatt
31261	ctaaaatacgc	tttctaagat	tttttaattg	tcataatttca	cagccttcaa	tttacgtgga
31321	tcaggatcac	agttttgcag	acttttaact	acagtgtatg	tgtaggaat	tttcttagaa
31381	atttttaggct	caatttccat	cctacagttt	tctacacatg	acaaagtaaa	ggtatgtctc
31441	aggccttctt	tcattaaaaac	tgtagtgaac	atagatagtc	aacataatgt	gaacattgaa
31501	actataaatg	aacataaccc	tgacctggcc	aaacaatggt	agatttggta	aaatgtacat
31561	tctctaatag	tgaatatatta	acaaactaag	aatctttttc	tcgtaagaac	ctacttcaaa
31621	gggaagctgt	tgtttaataag	gcattctactg	tcgactgtat	tccaggctca	gtgctgatta
31681	ctgagaacat	tgacaaataa	aatgacagat	ataattctgt	cttgatagaa	cttatcatct
31741	agtgattctg	tgaatgttga	ataggattac	agtagtttcc	cYttatctgt	gggggatgca
31801	ttccaagacc	cccagtggtat	gcctgaaact	gtggatagtt	ttgttttctt	ccaacacaat
31861	cacattgtgt	agggtctata	gggtatagag	tggtgatatg	ctggacaaag	ggatgagtca
31921	catccagggc	atgtcagtg	gatggtgtga	gatttcatca	tgctacttag	aacaatgta
31981	aattcaaaac	ttataaattg	tttatttctg	gaagttttca	tttaatat	tttggaccat
32041	ggctgattga	ggagtaaccg	aaactggtga	aagagcaacc	atggataaga	agagtctact
32101	gtatacctgg	gaaagatctg	ttacaatttc	atttacttat	taaaaagtca	ataaatggta
32161	actggtataa	ttctatacat	ttagtttttc	tttctaata	gatcacataca	ataagatggt
32221	aatagaaata	ttcttaaaaa	gtaaaatact	caaattgggct	ctgtctaaat	agccataaac
32281	cacgaaggca	tacattctcc	tttgctattc	caatgtgttt	aatcatgtgc	tagtttatag
32341	cctgtttcaa	aacgtaatat	tccatagtta	gtactttatt	tttcttcaga	aaagtctact
32401	tgtttttaaat	tttgaaaaaag	attttcctat	gggctaggtta	aattgcagaa	ttagtaataa
32461	ggagaggaag	actttttgat	acgttgatgc	taattggatg	ttcatcaaat	tttataaacac
32521	cagttgtgtc	cctttgtaca	ttgtttacta	caaattaaat	atatgcaatg	taattttatt
32581	gtcaaaaaag	tggaattgtg	catattttct	atgaaaggac	attcaagtga	gtgacctatt

32641	cttctttttt	tgtggcccat	aaattattcc	tagttattat	ttttaaaagg	gcttaattgc
32701	ttttggtaaa	taattgtaag	tatttcacaa	cttaaatgtg	aattcgcttc	tgtagtacc
32761	taagggtatt	gatatgcatt	lacattgatg	cactaatatt	aaaaaagaca	gatatttaaa
32821	gtacagcaaa	ttattaatag	tctttcctcc	agtgattagc	atgaaaactc	cagtgatgat
32881	tgcaagtaaa	gacggtatat	gtgctttgtt	ttcctttgag	aaaagaaagc	aaatctttaa
32941	gtccaattaa	cctcagtcag	ttttaagcaa	atagttattt	cgcaattact	atatgataga
33001	ctcagtaaat	gatataagag	aaataatata	cagaccttgt	cctcaaagta	ttcatagaat
33061	cttggttaggt	tgatgcacat	agagaaaaac	agctcagatt	gattaaatat	ggttgacctc
33121	tggtgtctgt	gaggcattgg	ttccaggaaa	ccccacacc	aaaatctgaa	aattcttaaag
33181	tttctgatat	aaaatgatat	agtatttgca	tataacctat	gtacctctc	tcatatgctt
33241	taaagcattt	tagattactc	ttaataccta	atacagtgta	aatgctatgt	aagtagtggc
33301	tctaccgaat	tatataatata	tttttggtat	ttttattggg	tttttttctt	aatatttttg
33361	agcctcagtt	tggtgaatct	atggagttga	gtctagatgm	agaacctgtg	gatagtgagt
33421	gttaactgta	cttactatgt	gcaagctact	ctactaagtc	ttttgcatgt	attgtcttat
33481	tttgcctca	caatattctc	aagaaatagg	taataattctg	atctcaagag	gaaactgaga
33541	catccagaag	ttgaaatata	tacatgtatg	tgtgtgtgta	tatatatata	tatatatctt
33601	atcattaaag	gaagggttta	aggtctagaa	tcgacttcc	tgaatttgaa	tcctaactct
33661	gctacttact	atctgtataa	tgttcataaa	tacatgaacc	tagaagaaat	tgaagaataa
33721	catgcaagga	gcgattctac	gtgtggtaac	tgctctggta	agtattacct	gagccttgtg
33781	gttttacaga	cagtaagtag	cagagttagg	attcaaattc	aggaagacag	attctagacg
33841	ttaaacctt	ccctcttaat	gatacattat	actgtctcca	gtcctactgt	gataagtggt
33901	agaactgagg	tgtctataga	attttggttg	acttgagagt	tgaaaatgct	tacgtctgaa
33961	taagggtgaaa	gtgagtttta	ttgggaagga	ttgtaggtac	aatcatgtta	aattcatttc
34021	caggctgaat	aaaacaattg	ctattttgtt	catgaaatag	tagcacttca	cacagtgtta
34081	acacctgcat	accccgaggt	caccttcatg	actcttaata	atctctattt	cctgcaagct
34141	tagccctgca	cagatattga	atatggtttt	gtgactggag	acatggaagc	agtgtttttt
34201	tttttttttt	tcaagtcctt	tatgatggac	ttatcagttg	ggtgccagtt	gagtaacagg
34261	ttgttatact	tattacatta	ctacaatata	caatcattgt	gtttaataat	tttgcattgt
34321	tcctatgtct	ttctgtaact	actctgagaa	tggaaccag	tcattccctt	cttatttatt
34381	ttctacaagt	gccttttcag	gtctagctct	tagttatatg	gccttgcaag	cttcttctac
34441	tcaacactga	gaaccactct	ccccacccc	caccagcaa	ctcccgaatc	ttgaggcttt
34501	acctcactaa	accctgaaac	taggatttaa	tctatactca	acttgatggt	gtcacctaaa
34561	cgcaacctcc	caccccttta	tattccaagt	atttacgtcc	aacactttcc	agaagagaaa
34621	agggaaagga	ccaatgtgta	catgggaaga	agctatttcc	tcctttcttc	tattgaaact
34681	gaaatctagt	cttagctcta	cccactccct	cttttcttaa	gaaattttat	attatcaatt
34741	acaccaggtt	aataaaatgg	atttttctta	ccaaaatttt	gaaattccca	ttcttatgac
34801	tggtgatatt	ttattgactt	gaaagaaata	acttcatatt	tattttaaac	tacacaattc
34861	agcactctac	tgtttgtgat	cccatgggca	aataagtggt	gctctcaaac	atttcattga
34921	agagtttaaat	agaggattta	ttgacgaaga	tgtaaatagt	gttaaaaggaa	tcaacaagga
34981	gtgttgaaatc	accagaacct	acctagatga	cttacatgaa	gactgataag	gcatgggagg
35041	aagcattatt	actagacaaa	gcaatagagc	catgggagag	agaccatcac	tcatagtagt
35101	agtgcagctac	agtgcagaaa	aagaaagaga	atcactgcc	ataccaaaat	caggctatga
35161	ggaactggga	ataagggata	cactgatctc	actcctctta	tctatctctt	ttcatggctt
35221	ccaactgcaa	atccaaccag	aagtcagagg	ttatgggagc	ctaagtaagg	aagaccatga
35281	aagttagtct	ttcaggacac	agaggaaggc	agtgaagccc	tcagtgaatc	cagaagaaaa
35341	gtagagaaaa	accaacacga	gcatctacca	tttgatagga	cctattataa	gaagggtata
35401	tatatatact	tatttaattc	ttataaaatt	tcatatgagt	ggcactaatt	acattataag
35461	gataaaaaata	gggtacataa	gagtttaacta	aatttctgcc	tccatatagc	tagcaggagc
35521	cagacataaa	tttcaagatc	agagatctctg	gttccacaaa	ccatgtcctt	agccactctg
35581	ataatctKcc	ttctgaatca	gaatggactc	atgttaggta	taaagtgaat	ttgatataat
35641	tattgagatg	tgaggattgc	atatgttgga	ttgataactt	aggagaattt	tcctaaattt
35701	cttcatatat	agatttcttt	gtattcaacc	atcaccaaag	ccacagaaat	atgtctttaga
35761	aatggaggaa	aagaaagaat	gataataaaa	gcagtctcta	ctacttggtg	tctcttctaa
35821	tctctttgtt	tccataattt	gccactgat	ctttacttct	taccagtggt	tccaagtgtg
35881	ttactacaaa	ggaattatga	agattttccc	gtttttaact	tcctgagttg	tgcaatgtag
35941	atagcaataa	atgaccaatt	aagtcattca	attgttttca	tggttaattca	tgaaaacact
36001	attggaaaca	ttactgagtt	ataaacataa	tcataatata	tatgataata	aatgggaaag
36061	gaatttggtta	caaatataaa	gaaagggctg	cgaagctatg	ctgcaacaag	tataagatat
36121	ctgagaacca	taaattggca	tttgggagga	gctcactgat	tagtaattct	tatttaccta
36181	ctttgattgg	ccttaaaaaa	gacatatata	ttcctaataa	acatacattc	actcatgaat
36241	tcacacaaaa	cagtcaaaga	tcctgacttt	agagagtttt	tttgttgggt	gtttttattg

36301	agacaggctc	tcactccttc	acccaggctg	gagtacagtg	gcatgatcat	ggctcactgg
36361	agcttcaaac	tcctgggctc	aagaaatcct	cccacctcag	cctcctgagt	agctgggact
36421	acagggtgcat	gccaccgtgc	ctgactaatt	tatttttcgt	agagacaggg	gctcgctatg
36481	ttgcccaagc	tggtcttgaa	ctcctggcct	caagtaatcc	tcccaaagta	ttgggattac
36541	aggtatgagc	caccgcaccc	atccagggag	tttgattcct	gcaagatata	ttctaaggct
36601	ctcaaaatag	tcttgaaaaa	ctgcagtgca	gttggtctcc	attaaatata	caatagagca
36661	tttttttgcc	tagaattacc	ataaaaaata	ttcaatata	aaattgaatt	catatataaa
36721	tatatgactg	gaagtctata	gtaaagactg	tgatagtgat	ttttctgcat	tttataaatt
36781	aaaaaacata	gtttttcata	ttttaatctc	tctaaaatta	ggatgcatcc	ttcaactctc
36841	atttgcaatt	gtaattagca	ccatgtttgt	cittattagt	gatgtgtaaa	atagttgcac
36901	atcttacaat	aggaacacatt	ttagattaaa	taatgtatgg	tattttttaca	aattaagtta
36961	atggatattc	ctggaaagtt	aagttaaacc	tcactgggca	agaagccaca	taaagagaat
37021	aactattttta	aagaatacct	ccaaaagaaa	aggcagtagg	aaatatacca	attagaaaac
37081	ataggacagt	aatagcaatg	agaaaaatta	ctgtctaaat	taaaactggt	gcctcaatca
37141	tagaaggata	tacacagaaa	taggaaatac	acagagatag	cttatcttga	atcattacca
37201	caaagcaata	tccaaaatat	ctattgagag	aatggtaggt	ttttctaagc	aactcaccaa
37261	aggaaggatt	gtttgcctgg	ctgcagcaga	cagccacctc	ctgagttatc	attttgagta
37321	atttcttttt	cctaaaaaat	atccatcatt	agtctcactt	tttggatttt	cttttttttt
37381	ttttatggag	attgtgactg	atatatgggc	accagagtct	taatttgtag	aaaaacaaaa
37441	aaaaagtatt	taggttagat	ttagttattt	atatacatca	gcatgaagta	aagcaatgta
37501	cttaattttcc	tcttaataata	ccttttaaca	aaggaataaa	taatatataa	ttcatttttt
37561	attcaaaagta	cttcacacaa	ttttgttgcc	tttatttcac	caagtctcct	ctatttaata
37621	cacctatgct	aagaagcttt	ggcacacact	gcaaaaagca	ctSaacttgc	agtcaaaagg
37681	tatgactttt	agtatcgtac	tagtttttct	gcttaattga	tctttgaatt	tatggaaacc
37741	aagacgctgt	tctgaacttc	aatttttcca	tctgtaaaac	aggaataata	aaaccaatca
37801	caaaggggta	ctactatatt	aactggatga	aactatgtga	aagcaggtag	caaatgaac
37861	agtgtttcta	catacattat	ctctgcagta	aaactatgat	gtgtaaaact	agtaaagaaa
37921	aaaagtcata	agtgatcata	aaagtcata	tattcattgt	catcaaactt	cagatttttt
37981	tgggagattg	gaggactcta	agggagacaa	acaaatgtaa	actgcagaat	aatgagtttt
38041	agggcccgct	actgttacct	caatttgaaa	acctgcta	gaggaccaca	ggaactcttc
38101	tggcagtgaa	gctgggtact	cctagaggaa	aaatgcacaa	aaaacacctc	ccaccgaaaa
38161	caaaagcacc	ctgaattatg	attttcaaaa	atatctagaa	gtttatatat	caattatWtt
38221	atctcatata	aactgtgttt	gattccaggc	tagctttaaa	tagactctat	atttttaatat
38281	ataactaaac	aaatgcctcc	agtgatagtt	ctgaaacgtc	attgtcctta	aattttttgc
38341	taaggacatt	gtccaagtgt	ttgtactta	gagactttca	gaattttcat	cgctacctca
38401	aagtccaagc	ttttctgagg	tccagcgttt	tgagcctctt	gaacctggag	gcaaggttag
38461	gggttgggaa	agtaaaactg	tcaagagact	ctactgggca	agccctcaca	gcaaggagtt
38521	gggaagagag	ctgacagcaa	gctctgggtg	ctcccacagc	aatgtcttac	gagggctcct
38581	tcggaggagt	taataaataa	taaagtttgg	ttcaggactc	caggcaagaa	tgacaactct
38641	ggctgaggaa	atttccaggg	gctgatattc	aaaaataaact	taaagtcaca	ataaaatatg
38701	ataagtgccca	tgtaataatc	ctacaatgga	atacacacag	atagcattgt	ggttaagaac
38761	acagttccca	cagtttcact	tctgggggtg	caaagtagga	gttccatgga	cccactcccc
38821	agcaaaaata	gcagagatgt	caaaaatgaa	aaagaaatga	acaaaaaaca	acactaaaca
38881	aaaagtttac	attctctgga	aataattgca	aatcatatat	ctcataagtg	atatttagca
38941	tatacaaaaa	tattataact	cagtatgaag	aaatataaac	aaaattaaaa	aaaattaaaa
39001	tgggcaaaaga	tctgaacagt	tctgcaatga	agatatattt	atataaatgg	tcagtaagca
39061	aatgaagaga	tgctcagcat	agttttccat	caaggaaatg	caaatcaaaa	ccacaatgag
39121	ctatgactac	aagcccacta	ggatggctat	attcaaaatg	acagataata	acaaatgttg
39181	gcaaggatgt	tgaaaaatca	gaatgctgat	acattgctgg	taggaatgta	aatgggtacg
39241	actccttcag	aaaacagctc	agcagttcct	caaagtgtta	aaagtagagt	cactacatga
39301	ttacaaaattc	cactgtatat	ataatcccaa	gagaaatgaa	aacatatgtc	catatgaaaa
39361	ctgttactca	aatgtYtcata	gcagcatggt	tgattgcagc	caaaaatgga	aacaacccaa
39421	aggtctatca	actggtgaat	ggatacataa	aatgtagtat	accataaaaat	ggaatattat
39481	ttggcaatag	aatgaaatga	catgttgata	acagttgca	gcatggatga	accttgaaag
39541	catgctaagg	gaaagaagYc	agacacagag	gatcatgtat	tatatgaatt	catttctgtg
39601	aaatgttcag	aatagacaaa	tctataggga	ctcacagggg	caaaaagtaa	ttcgtgattg
39661	cctaggtctg	ggaaagtttt	ggagattggc	agatgacagc	taacaagagt	ggcatttttg
39721	agggggagct	ggtaataaag	ttctaaaact	gactgcaatg	atgattgcac	atatttgcga
39781	atatactaaa	gctattggat	tgtgcacttt	ggatgggtga	attgtatatt	atRtaaatta
39841	tatctgaata	aagctacttt	ttaaaaaaga	gagagtctgg	ttccccagac	tgccatgtgt
39901	taaatcccca	cctctcctac	ctgtgaattg	aggccaggta	tttaaaactc	atgattctgt

```

39961  ttcttcatct gtacaatgga gataatataa attacctacc tcataaagct gttataaaaa
40021  ttcaaataac tagtacatgc aaagaacaaa gaccttctaa cagaacctgg cacatgaaaa
40081  gtgtgatatg tgtccattct tcttatgcac agactgttaa gggagagcat gaaaRaagta
40141  tccaacttat gggtaaggca gtcggcaagg cttaaaggat gatatttaaa ttcattcttga
40201  aagatgagca gggattatca aggaatagat aagagggaag ggatatccag cattagaaag
40261  agtatatgcg gaagtatgta gatatgatat tctatcaaga atttaaagta tcctaaaagt
40321  aaattcaaat attttctgaa gtatatgaaa ttgaaataca gaaaattcca gcaacctatg
40381  tgtcatgtct tctctttttt aagagttcct ttagagacaa ttcagtaaga aatttctctg
40441  tgactatgaa ggtaatatgg tatgatgtaa ataattattca ccaagttaaa aataacattg
40501  ctacaactct gatccagtgt aaagtttagg taaaatagta ctcattttta ttattgaaac
40561  agtgtaatca gtagacatag ctctgtgttg tgtacatatt ttgttttgtc tcttcttctg
40621  agtgtagtca tcttaggtga atggggaaaa tatgattttt ataaacagac tcttaagaaa
40681  aaatggccta tgcaaatgat gtaatttaga gcaaccatag tatagtgtgt cacttcagcg
40741  ctactaaat aaaatcacca taagaattga tgcatgacaa tggcttgaca atttcttatt
40801  cttttgtatc acaccaattc ttgaaatgat agctgttgca cagacatgtg tgagtattgc
40861  tattgtatat gtgtagcca tgcattgccc tacttttctc ctcttggaag ctggaacctg
40921  aattctttaga ctaataatg agtaaatatt tcagagatgt gttactctta ttacttctga
40981  aaaacagatc tactacttgt ctctagacat ttagaaagag attgacagag tcatttgcaa
41041  attcaaagat ataaaaacag taggtagatt gacttccata atcaaatcaa tatttggtta
41101  gaacatttca caatattcta accgaaatta catgaactac attatatatc ttcagaaatg
41161  cagtgtacca ctccatctga acaaaaacat aatgttaaagg tgccttgaa gctttaagtc
41221  atcttttggc aatgcagtag tttcaacata atcacaagac aaaaccagtt ccacataaaa
41281  ttcttcagaa atgaacatga atataataaa aaacttgaga gatgctactg aaatagattt
41341  tacatttcaag agttacaaag gaacacatta gtagctatta aagcttacag ataacattac
41401  catctagctt actaataaat ctcatgttta gtattttctc tagtctttac tgaaccttta
41461  agattattaa tttttttcat attttattga tatggctagg atagagttat taaataactt
41521  cttcaagtta caaatatgct aaaaaataagc attgaatcct tatctatcta atttactccc
41581  agccatgatg attctaacaa ggaactggcct aatttcctgc cacaaaaggc tataaaactg
41641  agccaagtat ggaaaaacct tttcagacat tagtcaattg gtagaaatgg actttgaYac
41701  ctaaaaggtt ggaacaact aaatgatccc aacaattatc ccagctttct tgctgctggc
41761  agtttccata ctggagacat gaaagtatgg atccaaaaca gaacttgtca gcctcactga
41821  gtttacgaag tagagatcag agggtgagaa agctgatgtg gttggcgcat attatctcat
41881  ttttgagata tgttgtaa at tagagggagc tgagcaggaa aatatattaca gaaatgtgaa
41941  tcttgccctga gtactagacc atcaatgcta gagagaaatt ctacaagtgt gggcaagaaa
42001  tgacaggaat cagaacaatc gccagagctc acacatgatt tttgagaaag gtttcatttg
42061  gggagatcgt attgtatcaa gaattcaaaa aaaaatgtag aaagtatgta tttatctttg
42121  agtgtgttag tgatcgatag aaatttaggt gaatatctaa atatctatat agatataaag
42181  taggatactc ccacacacct tgctattttc gtgttttaca tatttccctg acctcccaaa
42241  atgtccagYt tttgttagg aagctgcacg ctcatcttcc cctctgagc tccaaagaca
42301  tgttgatgtt cttgctgttt catagctgat ataaattagc attgggtaaa cgacgaaaaa
42361  acgtcacaga aagtttttct tgttcacatt ttggaaatct tccttctcag tagagaaaag
42421  caaccttaaa gttgcaacat catgattgga tttcagttca caaaagaaaa taaattttga
42481  caaatcacat atgcttttcc tgtccctccc aaaatgctgc agtcttccat ggcagcctta
42541  ccaaagaaaa aactaagtcc ctaactggaa Sttggaattct ttcaaaggca cagtaagagg
42601  ttttgaccaa tagagaagca ttgatcaaat cactatccac tgcattacat ggtactctag
42661  gagagtctga aatgagaata gatattctta aaaagcatcc aaatctgggg ctggtttact
42721  catctgtcag cttctggaat agtgaacatg ctattaaaaa tcagctcctt ctgggaggtg
42781  ggaagataat caaggggaga cccaccatag tgcattggaag tcccagaaat ggaaaagctg
42841  atcaaaggaa ggaaggtaat atactttttt tgttattttc acagcatctc caggtaaact
42901  ggtcgaaata cagaggtttt ggattagaac aaaaaagtcc ataattgctg aaactgaata
42961  tccaagtatt atgttaRcct ggatagaac cagcaaggaa tttcagtttc tctaggtgat
43021  tgtgatcctt gcatcatgtt taaaattgtt atttttcaga attttttttt tttcatgttt
43081  ggaagttagc acgagcaaa gaaactttaca cctcctctct cctcctctcc tctcctctct
43141  ggaaggctct ctcctctctc tcatcctctc cgtcctctcc ctctcctctc tctcctctct
43201  cgtcctctcc ctcctctctc tctcctctct cactcctctg ctctcctctc tctcctctct
43261  cctcctctct ctcctctctc tctcctctct cactcctctg ctctcctctc tctcctctct
43321  tcttcatttt ttttttaaac cattgctagt ggtatgattt ttgaattggg aaaaacaaat
43381  attcagacta aatattttcc caatgatctt tatgtagagt aatgtacttt gcaattcaat
43441  taaaaataac aagctaggat ggtgttctga gccaaatgta atctccaaga ccatggctag
43501  taaagtactc aagaaaaaag tattgaggcc gagtagctcg aagtctaYtg gggataaag
43561  aagcagctga ttagcatttg aaagcaaggt ctttactgtg tttaaaagtg aaggagaatt

```

43621	ttttaacaga	Rcactcatca	aaaacaaagc	gtttgaaaat	tacccctcct	ttgtttttatc
43681	agtctcaggg	aagatgcact	tcgaYacacg	tctcaggaat	taagatgcat	ttcgatacat
43741	gtaatatattac	atlttggtgac	actgctggaa	catatgctga	gaaatgcaag	aataaatagg
43801	actaatgctc	atlttctNttt	tttttttaat	cacttgcaag	tgacatttgt	ttcatctagg
43861	caggaaagca	ggatcttata	ggcagggtag	gtgtaagggc	tgatttttagg	tcaagctttt
43921	caattttatta	tgcaataaaaa	tatagcaata	aaaatatgca	tctttatatt	ttccagttaa
43981	ttataggaat	ctccgtttta	ttttttatat	atgtgctaata	aattaattca	gtactacagt
44041	ctggatccac	agtccttttg	ataagagctg	gcacagaggt	cattttttatg	tgccctatta
44101	ttaatcttaa	taatatgtag	taatatctct	ttatatgctt	attgtgacac	acagaaactt
44161	aaagcctttg	tagcttttaag	ttcagatgtc	tccacattct	tttgtaaatc	cctgcagatt
44221	tgtttcttgc	ttttaaatat	cagcaccttt	ctgctgtcta	ctcttaggtc	tctgccctct
44281	atgcaggaga	tcttttcttt	taagtttccc	accgtgcttc	ataataaaaat	caaaagaaaa
44341	aggtacatcc	ctcagaaagc	attcatctca	ctaKaaatag	aaaacctgtc	accttattct
44401	taaaacctta	gatcagccag	gccagtggtc	gaaatagtga	gggtagtgtc	tacaaagggg
44461	ataKagtagg	ggtagcaaaa	taattatgta	ccttggtctc	tccacatctt	ttagggaaga
44521	gactctttgc	tctgaaaaat	gacttaatac	cattgggagg	aaaacatttc	ctctacccac
44581	ttaggcttcc	atgttttaggg	gcctgtgaaat	taactgataa	tagacagatt	aacaggagaa
44641	aagaaaaggt	taatctacac	atgcattgtga	agtcactcaa	taatgagtcg	tttctggaat
44701	accagagagt	aaagattggg	atagcaactt	aaaaaaggga	agggagagtgt	ggctagggca
44761	tcaatgtgta	gttgatctcc	ttcctggRat	tagcagaaaag	ctcttgaggg	agagttaata
44821	gcagctgtat	tgggggtagt	gtcagcttta	gttaggtaag	ggaaagtcag	atcagatttc
44881	aaatattttc	actttaatct	ttatgctaaa	actgtgatc	cttcaatatg	ctgatgaaag
44941	ttgaagtgtg	gcttgaaaaa	aaagagaaaag	tataagtaga	tttattctag	atataaagca
45001	tttttttagt	atagtagaaa	gagagaaaag	gaaagcaaca	ggcacacaca	cactgagaga
45061	gagatttttg	cacgacctag	tcaaagacta	agagtacccc	aagttcttta	tcaacctagt
45121	agtttctgca	acctgcagta	tacacacatg	catacccata	tactgatgga	ggcagcttaa
45181	attaatgggt	aagaatatga	acttcagcac	cagagggcat	tggaattcaaa	tttcaatctt
45241	tcttacttagc	tttgtaactt	caaacttttt	tcctcttgga	agctggaaac	tgcattttta
45301	gattaaacaa	tgagtaaata	tttcagagat	gtgttatata	gtttacttct	gaaaacagat
45361	ttattacttg	tctctagaag	tttagagaga	gatcgacaga	gtcatttgca	aattcaaaga
45421	tataaaaaac	aggtagactg	actaccataa	tcaaatacaat	attggtttag	aaaatttcac
45481	aatattctaa	ctcaagttat	gtgaactata	ttatatactt	ttacattatt	tatctacctt
45541	caagtttcag	ttctctcctt	tgcaaatgac	aataacaata	ccaaaaaata	aaaaaactaa
45601	atgaggtaat	gaacgtaaaag	tgataaggat	gatgacaggc	ataaagtaag	ctttttattg
45661	ttttttattg	ctttttcctg	tagcctgaaa	atatgttcaa	ggtaaaaaaa	agcattcttt
45721	tgctctgaat	ctccttttatt	ctaccaattc	ttttctcgtg	taagtgtctc	agactcttca
45781	gttgctctca	ctttgtcatt	tatttttatc	ctcaaatcat	tgatatttgg	cttctatttt
45841	cactttctca	aacaaattgc	ttttttgtct	tcagtatctt	ctacgtgaca	aattaaatgc
45901	atgtcttcag	accttacctt	cctggacctc	tcacctccat	tggaatccac	tggcaattta
45961	ctcccagaag	ccctgtcctc	tcttgcatct	tcaacatctt	ctgattctga	cctctctatt
46021	cctttgttta	tttgttgtgt	tgtttgagac	agagtttcac	tcttggtgcc	ccaactggag
46081	agcaatggca	tgatctaggc	tcactgcaac	ctccatctcc	tggtttcaag	tgattctcct
46141	gcctcagctc	cccaagtagc	tggtgattaca	ggcatgccc	aacatgccc	gctaattttg
46201	tatttttagt	agagacaggg	ttttgccatg	ttggtcaggc	tgatctcgaa	ctcctgacct
46261	caggtgatcc	tcccgccttg	gcctcccaaa	gtgctgggat	aacaggcgtg	agccacagtg
46321	cccggcctct	ctattccttt	tacctcttc	attggattct	cttcttccag	agtttcatcc
46381	ctggccttca	ctatacttta	ttgaatgact	tcattttactt	tctagaaagt	tataaacaaa
46441	tttttatttc	caaccctagc	ctctctctcc	tgcttcagac	tcattatcca	cgagtactat
46501	tgaaaaaagt	attctatatt	taatgacaaa	aaaacagaaa	atatggaaaa	caaaaattaa
46561	cagcaaaaatc	ataaaaatatt	cttccatcaa	aagttacttg	ctaataatttt	agtgtctacc
46621	actagctaaa	cttaactaca	tttctttatc	tataaaaattt	gaggttaattg	aggtcccaaa
46681	ctcataaaaac	tattgagcat	gaatacacaa	aaagttttta	aagtacccag	cacatactaa
46741	gttccatattg	aatattttgct	gctattattt	ttttcaattt	caaacatgta	cacacatggt
46801	tcaaaattcaa	aaatgtagct	ttgtacattt	tcttccattt	tagcaaatatg	caaatgagta
46861	tttttaattg	aatagatttt	tttttttttg	agacggagtc	ttactctatc	actctgtcac
46921	ataggctgga	gtgcaatgcc	gtgggtcctag	ctcactgcaa	cctccgcctc	ccgggttcaa
46981	gcgattctcc	cgctcagcc	tccagagtag	ctgggactac	aggtgcatgc	cactacacct
47041	ggctaatttt	tgtagtttta	gtagagacga	gtttcactat	gttggtccagg	ctgggtcttga
47101	actcctgacc	tcgtgatctg	cctgcctcgg	cctcccaaa	tgctgggatt	acaggcatga
47161	gccaccgtga	ccagctgtga	atagatat	ttaacagatg	tgatcagtag	attttttcag
47221	ccacttagtg	aataatttct	acagctgcct	caaagtgtcta	ttaattttatc	taggggttga

47281	tgtaatcccc	agccttctaa	ctgttgacag	ttttatttct	cattccctga	actatgttga
47341	aatgcaaat	aatgtcttta	cagagatatt	tttgaatctc	tctattaaaa	aaaaaaaaag
47401	aaaaaagaaa	aaaacaaacc	aatcccgaa	ttcaaaatgc	tattcttggg	tttttaaaaa
47461	atgacctata	gtccaactct	gtgtagataa	ttatgtgaca	gggcattgag	acactgaagt
47521	tgacagccca	atgtgctgtg	ctgtgtcata	cagatagact	taaaaaaaaa	aagccccagg
47581	ctgggttctg	tggctcatgc	ctataactcc	agcatttggg	gatcacttga	ggccaagact
47641	ttgagacaag	cctgggcagc	atagtaagac	ccatccccc	ccccaaaaa	aaaataccag
47701	gcataacagt	gtgtgcctgt	attcccagct	actcaagagt	ttgaagcagg	attgcttgag
47761	cccaggaggt	tgaggatgta	atgagccgtg	attgtgccat	tgcaactcaa	cctgggcaag
47821	ataacaagac	cccatactct	aaagcaaaac	aaaacccatc	tctgattgta	gcgtatttag
47881	gttgttttca	acttcttcct	agataacttg	caatgaacgt	tttaaaaaa	tatacttgtg
47941	cacatttatg	ctcattttatg	attattttaga	tgtacaatta	ttagatgaga	taataataaaa
48001	aattttacag	ctttcacttt	tatttttctt	tttcttttat	tttactttta	gttccaggat
48061	acatgtgtag	aatgcgcagg	tttgttacat	aggtatacat	gtgccatgtt	agtttgctgc
48121	acctaccaac	ccgtcatcta	gggttttaagc	accacatgca	ttagggtattt	gtcttaatgc
48181	tctccctccc	cttgccctacc	ccactaacag	gccccagtg	gtgatgttcc	cctccctgtg
48241	tcctagtgtt	cccattgttc	aactcccact	tatgagttag	aacatgaagt	gtttgtgtgt
48301	ctgttcattt	gttagtttgc	tgagaatgat	ggcttccagc	ttcatccatg	tccttgcaaa
48361	ggacatgatc	tcattctttg	ctatggctgc	acagtattcc	acgatgtgta	agtgccacat
48421	tttctttatt	cagtatatca	ttgatgggca	tttgggttgg	ttccaagtct	ttgctattgt
48481	aaatagtgtc	gcagtaaaaca	tctgtgtgta	tgtgtcttta	tagtagaatg	atttataatc
48541	ctatgggtaa	ataccagta	atgagattgc	tgggtcaaat	ggtatttctg	gttctagatc
48601	cttgaggaa	cgccacactg	ccttccacaa	tgggtgaact	aatttacact	cccaccaaca
48661	gtgtaaaagc	gttcttattt	cttcacagcc	ttgccagcat	ctgctgtttc	ccagcttttt
48721	agtaatcacc	atcttgactg	gttgtagata	atatctcatt	gtggttttga	ttcgcattgc
48781	tctaatagatc	agtgaatggt	gagcttcttt	tcatatgttt	attgggtcaca	tatatgtttt
48841	ctttatagaa	gtgtctgttc	atatcctttg	cccacttttt	tatgggggtg	aggctttcac
48901	ttttttattg	tgaatttggt	ttctggaaaa	cttttaccaa	ttttaattca	cataagtagt
48961	gYatgagaaa	gtctactttc	tcacatgctt	gcKgataaat	gttaacattc	atttttatcc
49021	ttgccagtc	gataagcaat	aaattaaata	gttcttggtta	ttttaatttg	tattcccca
49081	aggatgttta	agagagcaaa	acaataaatR	attcacccctc	aatgggttgct	gttaaacctt
49141	gtctttttta	aatttaagct	ttaaagatta	tgactttaat	tattttttct	tctcataaat
49201	aatattttctc	ttctaaataa	ttctaagtca	caattatgta	gggataaaaa	agaaagtata
49261	cattttaaatg	ctttcctcca	ttaaatttga	atgtgtgtta	attttgatt	cagtgtcgca
49321	ggttttttaga	gaatactgtc	tttggttcca	tattgaacat	tcaccttgag	gacttttagtc
49381	tattgtattga	aagcttttagt	tcacttaata	gaattattat	gacacatact	ccaRctaaaa
49441	atcagtcagg	gacagtccca	gaagttaata	ctcttccaaa	gactgatgcc	tccactgagc
49501	acctctagga	agtatgagat	ggKgttgcat	cacttctcac	taagttctta	taaccacaca
49561	tccaatata	caacaaattt	ctcagctctc	accttcaaaa	attacctaaga	atccaattat
49621	gtcttattaa	atccatttta	ctgccaaagtc	acttctgatt	tattgcaaaa	ggctccta
49681	tgatctccca	gcttcttcac	ttgcctcttc	cagtctattg	tcaatagtaa	ctgtcaactg
49741	tStagtaa	tgtagaaata	tatctgatca	tgtctctcct	ctgctcagag	cccactgtgc
49801	ttcctatctt	agtcaaaagta	acagctgaca	tcatcatagt	ggcctaaaga	ctctagtga
49861	gctctgcccc	atccaaatac	attgcctctc	agatatttcc	taatatStgg	ctctagcttc
49921	cttggtccta	gccacgctag	tgtctcttct	gtctcttaaa	caagtcagag	actcttaact
49981	gctgtattta	tacttactct	ttcttctgtc	tgaatgctgt	ttctacaSag	gtgctttcta
50041	attgaaggt	caatcatttc	tcacatatgc	cttcttctca	ttatttgtKt	aatttctctt
50101	cacagcacct	atcatcacca	tctgacattt	tatatatata	tatatatata	tttctttttt
50161	tggttgggtg	ctgtcactcc	cactaaaatg	taggtctaga	agaatagaaa	tggtcgttgg
50221	ttgtttgttt	tggtcactgc	tgtattctta	gtgtgtgcct	ggcattaaca	ctcttttgaa
50281	tgactgaa	aatatctgaa	tttctgttat	ttccctataa	gtaatatatt	ttggataga
50341	aatgccacta	atcctgaaac	attttcaagt	tttatatggt	ttttatcttt	aatatttggtg
50401	tggtctttctg	ctacattcca	atatttaatt	agcttttagtt	tacattttatt	aatgtcttct
50461	atatccagat	aatgtcatat	cataagtttc	agttgacatt	tattaaacatt	actacttctt
50521	ataatatttt	aacagaaata	tgattcatca	actccagtg	ttgtaaatat	catcaccatt
50581	ctgaagtcaa	atgttgccaa	agtcttccat	taaataactg	cagacttctc	tcattttggta
50641	cagccagtc	ctccttacag	ctgcaatatg	ttatatctcg	aatgtatttc	ttgatagctt
50701	tctttaagat	aactgcactt	gcgaaagtct	ttgtaccta	aaaactttca	acaaatattt
50761	agagaatata	atttactcat	gcatgtggat	agacacatgt	aagattcact	taagtgtcaa
50821	atttactaat	ataatgaaaa	cttggacc	acaagcaaca	aaaaatatta	tccagcactc
50881	atactcaaaa	cgcagtctga	gagtttggt	tttttcagtt	cctaaaggtt	gatcatgtgg

50941	ttcataaaat	cttagtctcc	aaaaatgtatt	ttcaaagtga	tgtaggcag	aaccaacaaa
51001	tgagaactag	ggtacttagg	attattgttaa	ttgcctaagt	tggttggtga	ccttggtattc
51061	ccactttacag	caactttatgc	ttcttttcaaa	ttcttttgta	caaaaaaaat	tgcttggtcc
51121	actctccact	tagccttttaa	gtcactaaga	tgtaggctatt	tcattagttg	aaagcaatgt
51181	ctaaaaataaa	atatttttatt	ttaaaaatca	atcatcttgc	ataataatag	ctttaacttt
51241	atgctcaatt	taaaaatattt	gtattttaaat	aattgcttac	agaatagaaa	tagaaatgat
51301	atataagata	atataagaaga	tgtaaggatt	taagaagtta	ggatgacagt	atttttattt
51361	actttttatca	tttgtaattg	tatctttattg	tctggtaaaa	acatttaagg	aaagattaaa
51421	atctaagttt	aatgtattat	ttataaacat	ttgctccttc	ataaaaatctt	cctgcaatcc
51481	ctcttttttaa	aaatgttttc	attgcatatc	ccgatgatct	gcttttcttc	tctccatgaa
51541	actcagatac	tagttttctt	tacaacacct	ggattgtttc	ttcctctMct	gctgttcctt
51601	attttgtttt	tctattcttg	tgcttgata	tctcctttta	acaaattcca	taccattggc
51661	cttcttaact	tgtagaacat	tctaatactc	acatatgctc	tataaaaaaa	agtgagttt
51721	ttccaagaag	aacagtggcc	attaattctg	catatatcaa	aatggaatgt	gtcatctttg
51781	agcaaaaatat	aagctcacac	catgcataaa	gacaactatt	gtttgcttca	gccaggagta
51841	tgtttttaggg	aaaaaatatt	ttaaacaagc	cattaagaaa	tagtctcttt	tttctttaat
51901	gtcttttgagc	tacatatgtg	agcagaatta	taaagaattt	ccagtgaact	attcttagtt
51961	ttggccttcc	tggtcattctg	tagtctgtgca	tattaaaacc	tctaaacagc	tctcagtaaa
52021	gccttggcag	tagagcttgt	agcttgtagc	tatcaaaaat	gtcagatgct	tttttccaac
52081	gccatcacta	gcaaacata	ttacttagtt	attaacatat	aggaattaac	ggcaaaatct
52141	gcaagttgca	aacagtgttg	taaatcaact	aagcatttat	catgagattt	tttaagtga
52201	tgaatacaga	ttcagaatca	tgaagtatt	atctaataac	ccaacaagt	atgtgaataa
52261	atccttgcta	atatgaaaa	tatcagccac	tgaaacaccc	ttttctacaa	gcagggtctg
52321	ggatcctcat	gctaattgtac	ttagattgat	aaaccacaga	cattctctga	aagcttctgt
52381	tggtccagtt	gctgaggtt	gtgcttagag	catctgtcat	gcaaatgatc	agcaaatcat
52441	aacctgtaat	ttgttttcat	ttaataggca	gacaggtttt	caccaattta	gactcaagtc
52501	ctattaatac	tctttgaaac	taattgctgg	aaaatgaatt	ttaatgacag	gattttatca
52561	tttattattt	tcccttctgt	ccctataaa	gaagactcaa	agccatctac	tcacactttg
52621	aaaatatatg	ttaaataggc	acaagccata	atctcctgtc	atctgggctg	ttgcaaagga
52681	cccctaatacc	cctctcttgt	aataatccat	tctacactct	actcttaaaa	ttactttctt
52741	actatcccat	ttcccttcca	caaaatcttc	aattccctgt	caagtaataa	gcagacactt
52801	taatatggct	tcgttgccct	ccattattctg	tttgtagttt	acatattttt	atcctttttt
52861	gatatcgcaa	tataacatgt	atacagaaaa	aagcatgaMa	cattaattaa	taagtagtaa
52921	agtaacatcc	agaaaaacat	actcagagca	aaaagcagac	gattgtcatt	accacagaaa
52981	ccacctcccc	agtgcactct	tctgatcaga	cccttcccag	catcccagag	tctaaccacc
53041	cagagataat	cacttctctt	attttcttta	gattgtctcc	agctacgtgt	gaattcttaa
53101	ataatatggt	caattttacc	atttttgaat	gttatgtaaa	tggaatcaaa	atctgcttct
53161	tttggtctatt	gcttttttca	ctcaaattat	tctcttaaac	attcattcat	tttagggtag
53221	agcttcagtt	aacttcaatt	ttaagctgtt	tagtattcca	ctgcacat	gtaccacaa
53281	atattttatct	tttccatgtt	gatgggcact	tggtatttta	gattgtttcc	acatttgagc
53341	tattacagac	aagggtgcta	tgagcattct	tggtatgtata	gtttggtgcc	cagtattctt
53401	ttgtattcat	acctaaggag	tggaatttct	aggacttagc	catgcataat	catactagat
53461	aaatattgat	gtaatacgt	aaaccaagta	atattaactt	gtatataagt	agctctgtat
53521	gctactagac	aagtcaaaat	atttttcaaa	atggttgtaa	atttatatat	cgagcaggag
53581	tgaatgctat	tcactcctac	ttctatttctg	acttctagaa	ataggagcac	ttctatttct
53641	ttatatgctt	gacagtactt	gggattatca	gactacctca	ctttctgttc	ctcctctatt
53701	tattcttgct	ttaggatttt	ctatcctctt	gtttattctt	ccttcacctt	ggatattaat
53761	tctgacctat	tgcaattcat	gaattctttc	ttcatctgtt	tctaactctat	taatgactca
53821	gtcatatggt	aacttttggt	attgtctttt	ctaattctca	aatttgttta	gttctttttc
53881	aactgcgttaa	caacactcct	ttgtagtttc	cagtttctctg	ccaattaaaa	aagcattgcc
53941	cttctatttct	tcaaacacaa	taaacataat	atttccaata	tgcatctgaa	aattctagta
54001	tctaaattct	tgaggatcaa	tttctgttcc	ttgtttcttc	tgtaggttct	attattgaag
54061	aattattatg	ttggtgcaa	agtaactKag	gtttctacca	ttacttttaa	tggaacacac
54121	cacaaattact	tttacactaa	tctaataatt	cttttcaacca	catttctttg	atttttggtt
54181	ggacatcata	ttcaaaaatt	atttgaagga	atcatgttac	acctaagta	atattacctt
54241	tttctagaga	ggattgtgtt	tttctctgtc	aggaatctgy	agcctccatc	agggtagcac
54301	cataaattgt	gttaaaattt	gagattaaac	tatgcagtc	tggaatttaa	tccataggtg
54361	gaaaaaaata	gagtttcaaa	gaggttaagct	tcaattaaaga	cagattatga	tgccctcttc
54421	ttctgttaaca	tattgtgtga	ctttgagttg	agattcttcc	taagttttct	gatctattaa
54481	aaaagatata	gctggtaatc	cccaaaatca	tgattttctt	tttttttttt	tttttttttt
54541	tacagtttct	actgtatttc	tttgtgtgcc	tgtagtacc	agttatggtg	tggttggtct

54601	ttcttttctt	tatatTTTTg	ttgagcacag	tgattgagta	catgccccac	taatagggta
54661	taattatttt	gagagtaata	tctatgactt	aacaccatat	ctctcactat	attgagtgtgta
54721	gtaccttgat	gcagtagcta	gctgctcagt	gaatgttaaa	tggataaatc	aatgactgaa
54781	taaatttttag	agatagggtac	atagataaaa	gtgatcaaaa	caagctaagt	attactgcag
54841	agaaggaaca	agtatctttt	ctattatagt	tcccaaagct	tcaaccaa	ttcttttgct
54901	atgtttacct	gtccaatata	ttggctgggt	gtactcatag	agtactagtc	ttagttagaa
54961	tttatgagta	atgggtccaaa	tccgtaatag	agcttaaaac	taaagcttta	aaaacattga
55021	tccagatgaa	gaatgatagg	atgcaatgaa	agttttattta	gggcataaaa	tttaaaaggt
55081	atgttatcaa	taattcattt	tgaaagtccc	cttaatatag	ccatttctat	tctgtatctt
55141	taaccagtta	taggtgacat	tgctaggaac	agattttgac	agcagacttg	tgcaagggat
55201	ctgtttgcct	agagattttac	ttaaaaggta	gaattaaagt	catttcaaga	aagaaattta
55261	acataagaaa	atataacccat	ttagtacact	aaataattgg	tctagctagt	tatgagttaa
55321	aaatgaaaaa	gaattaatag	tttttagcaa	catatacatt	gggacagtat	ttttgcccaca
55381	tctatcattt	acctatgcaa	taattaaatt	cataattttt	taagtgtcat	atcgaagagt
55441	gttattcaac	ttcctgggtga	ttaaattact	gataaacata	gccgattttt	tttggttttg
55501	caggtcctga	aaaatagaga	atgcatatga	cttccaaata	ttggtagaag	agccagctcaa
55561	ataatatctt	ccatgaatcc	tcttaacaatt	aatttgctga	ttgatagatg	ttcaaaatct
55621	agaatgaat	gagttgcatg	taaggaaatc	agtacatgct	tctgctgcca	tcatatatca
55681	caatacaagc	attaaaagct	atattaatta	tagaacttta	tgatcttatt	tacatggtct
55741	gtgaatttga	tctttatttt	ggaattcctt	taatccattc	tgattctaat	cacctcagga
55801	ccaacttttag	tgtattttgta	caaggcgtaa	tcattggcta	gctctataag	ttgtccaaac
55861	aaccaaatga	gatgtcgcaa	attctgccaa	ttgtgtaaag	ttttattatg	tactttaaat
55921	atatgaatat	ttggaatatc	aagatgtggt	gtattttacc	aataatatta	aaggtttgct
55981	tgttcacttt	tcacttgtat	tatgatgtca	tttaaacaa	tcagtattat	tagaaatctg
56041	attcattctg	aaaacctctc	atctactgat	ctaagtatct	tcaatattca	ttaacatgaa
56101	atattactat	aataggaaaa	aaatcggtag	cttaacaaaa	aatatggaaa	tttatttggt
56161	tattttattat	ttttacttat	ttattttatt	attttattat	ttattttatt	atgtttttga
56221	gacagtctca	ctctgttgcc	caggctggag	tgcaatgggt	tgatcttggt	tcactgcaag
56281	ctctgcctcc	caggttcacg	ccattctccg	gctgcagcct	cccaagtagc	tgaggactaca
56341	ggcgccctgc	accacaccca	gctacttttt	tgtattttta	gtagagacgg	ggtttcacca
56401	tgtagccag	gatggtctca	atctcctgac	ctcgtgatcc	gcccacttcg	gtctcccaaa
56461	gtgctgggat	atttctttct	ttctttctta	cattctagag	ccttggcgag	ttggcccaag
56521	tggtgtacag	cattttcRgt	gtcagggaca	tagacttctc	tcctttctct	gctgtgtgta
56581	gtctcagata	gttaccagag	caccagccat	tgtatgttct	ttctagtttt	caggtagcag
56641	aaagaataag	aaatgttgca	caaaccaccc	tgtttacatc	acgttggtca	gaattagtca
56701	catggccatg	aagcaagcca	ctttgcctga	agtaggacta	cagattgtct	ttattctcca
56761	tagtggtaaa	atataaaaaa	atataattag	agaagaagag	aactcctctg	gaggacaact
56821	agcagtaacc	tactctacta	actgtccatt	tactagtcca	ttttgctcta	agataacata
56881	taaacagtga	aactaaaaata	tgttttcaaa	attagaaaat	gtaagtacct	tagataacca
56941	agattaaaag	aatgtttacaa	ataccacaat	atcaacatag	ttatagatga	acatcaaaact
57001	tagtactgat	tttctgaata	tccaaaaatga	aaagaaatc	ctcaataatt	ggttacattg
57061	tttttttatca	ttttgaaaaa	ggcactactg	aggcaaatga	agctctttga	ccctgaacaa
57121	ttacaaaatt	tatctcatag	caattttttag	ggagaaaatt	gtatattata	gttgacaata
57181	ttcctataac	aggtgcagtg	atttttataag	ctacttacag	tgtctttgaa	taaaagccaa
57241	aatgaaagca	ttatgaaggc	tattttgtga	atctctgagg	aaaaatcatt	caaaaaaaaa
57301	aaaaaacctt	tggtctattct	ggcttatata	caaggagaaa	ttttagcctg	cccagagggc
57361	tggttggaat	acatacacca	tgaatgggtta	tctgtaaaata	ttactgttgc	tgaaagattt
57421	ctgaacaaat	gtagaaaatt	aaggaataga	ttatctagtt	ttctgtagtc	tgccagcatg
57481	tttcaaatca	atcgagcttt	cttaacacca	ggtgttctca	gaagtgaag	gggcctattt
57541	gttagcttta	aaaagacaaa	aatgggaaaa	gataaaagag	gtggaagcag	aaaccaattt
57601	gctaaattta	ctaaattaga	cagttttattg	aaaaggtaag	tgaatttctc	atatcagtca
57661	taaagaagct	atttttccaa	tgaaatgtgt	gtttatatca	aagtacacaa	attacttagt
57721	gaataactcc	cagtaaatgc	gatattatta	atttcagcta	aatttatatg	tcttagaatt
57781	ttttttatctt	ttcagattgt	tttatgtaga	ttatagctgt	taaaatttta	ttggatgtaa
57841	tttacatggt	ttacaaacaa	taaatccctg	agaatagata	cgataaaatt	atagtttggt
57901	gaatgattta	ttattaagga	gtctcagatt	ggctcctccg	ggacaggaaa	aataaattca
57961	tggaacctaa	gttttttagt	tacttttatc	taatttttga	tatggtaata	attaaaaggg
58021	agatgataag	aaattgaatg	attaagcatt	gttaaataat	atgatgcgtt	aataatgcatt
58081	aagtttatatt	cctgagttga	ttctttcaaa	gtataaaaca	attttttagat	ttaatcaaaa
58141	ctcttttaaag	aattaatctt	tgcttttagg	gagcactata	gattgacatc	agaaatttct
58201	cttattttcca	tgtaggaaga	accttttgtg	atggctctctg	aaaatgtctt	gggtaagccg

P A T E N T
Docket SEQ-4095-PV

58261	aagaaatacc	agggtctctc	cattgatgtt	ttggatgcct	tatctaacta	cctgggtttt
58321	aactacgaaa	tttacgtagc	accggatcac	aaatacggaa	gcccacaaga	agatgggaca
58381	tggaatggct	tggtaggaga	acttgtcttt	aaggtaaaga	ttactttatt	tatttgtctc
58441	atacttaaag	gttcaattat	ttgtctcata	cctaaagggt	caacagtaac	accttgaaagc
58501	tgatttcata	taaaataagt	gtgatgtatt	taggttggtt	aagcattagg	tggtggaatt
58561	gagtacaaaa	gtctcactca	atactatttt	atgaactttg	tggaagaaa	agtagttgac
58621	aaaataaacc	taaatgttaa	aatatatcct	gtaatagaaa	agggtttaga	agaagacctt
58681	ttctttgctc	aacttatacc	ccaaaaacag	aaagtgtata	tgatacgtga	tgaaatcaca
58741	atgtaagtta	cacatgcaat	ttgtactatt	ttttttcttt	cttttttttt	tttttttttt
58801	tttttttttt	gagacagagt	ctcactctgt	cctccagggt	ggagtgcagt	ggctggatct
58861	cggctcactg	caagctccgc	ctcctagggt	cgcgccattc	tcctgcctca	gcctcccagag
58921	tagctggact	acaggcgccc	gccccacgc	ccagctaatt	tttttgattt	tttagtagag
58981	acgggggttt	acctggttag	ccaggatgga	ctattgtttt	ctttttaaaa	atgtgatgtt
59041	attggaaaaa	attaaaacat	tcactgctta	Raaactaatc	atttcattct	gtaatctaata
59101	caagataggK	atgtacatat	gtatatattt	ttctttgttc	tttcaattct	cagaaagggtg
59161	tttaaaacct	ctatgtcYtt	ctttagtccct	gtcagaatct	gcttcagttt	tttgaggctc
59221	tgttattagg	cacatagaca	tttataatta	ttacattttc	ctgataaatt	attgaatagt
59281	tggttttagg	tttataactt	actgtttggt	ttatatgtat	accatttttt	tctctgttgc
59341	ttcttttctc	gtttttcttg	gggttaattt	aatatatttc	agtatttgat	tttattgtctc
59401	ttactgcctt	tttagttgtc	tccctttgtt	ttttgttcg	tggttagtct	aaaggtcata
59461	atatgccttc	ttaacttact	acattctatc	ttaagttaat	attgtactac	ttcacataaaa
59521	aagtaataaa	ttttcagcaa	tataatttta	ttgtactca	ctcctttttg	atattgtgtt
59581	cacatatatta	tattttatta	acctcatacc	aaatatcata	gttttttatt	taaatatttta
59641	ttgtcttttt	aaggtacaga	aagaaaaaaa	aaaagacagt	tgctgggata	taactcactta
59701	tctaccgtgt	ctggggctct	ttatttcctta	catatatattg	agctcccat	tggtataaatt
59761	taccttcaac	ctgaagaact	ttcttttagag	tgtcttgaag	tgcaaggcta	cgtaggtagc
59821	atatactctc	aactttttgt	taccttgaaa	tgtctttttt	aaccttcatt	tcaaaatgat
59881	attcttactg	gatatacaac	cttgaattta	cagggttttt	taatgttcac	cattttaaag
59941	ttgtgattct	atcagttttg	ccatatatta	tttctgatga	gaaattagcc	atcatctgta
60001	tcctgattct	ttatatgtag	tatatttttg	tatgtgttag	tggccattct	acaagtttct
60061	cttcattttt	tggtgtttag	aaatttaatt	atgatgttct	agatatgatt	ttctttgcat
60121	ttatttgctc	gagagtccac	taaaactctg	ggatagggtta	catttagtaa	atatagagaa
60181	ttatttcttc	aatttttttt	accttctttc	ctttctcttc	ttgatttgag	gctcagagaa
60241	tattcaagtt	agatcactta	atgttgtctc	ctaagtcact	gaggccttgc	ttgttttatt
60301	aagatatttt	tactccctga	ccttcagatt	tgacaatttg	tcttgatctg	ccttcaagtt
60361	tactgatatt	ctgccacctt	caaatttttg	ttaagtcctt	tcagtagctt	tttcattcta
60421	gattgcttat	tttttctttc	cagaatttca	attttttgaa	ataattttta	cttttctgct
60481	gagatttctc	atctttttat	cagttatgac	ttctttttct	taaaagttca	tgatcacatt
60541	tataatggct	tctttaaagt	cctttgttgc	taaaatttca	acatcttatc	atctcagaat
60601	acattgcatt	ttcctgggtc	ctcacatttc	tggttacatt	tgattatata	ttggacttcg
60661	tggttgatac	attgttaaga	cttgggatta	tgtctctgaa	attgtatatt	ctgaaaagga
60721	ttgatttttg	cttcagtggg	tagttaaatc	actatctgtt	ctcttgaatt	tgtaggagatt
60781	tagctttaaa	cattgttaag	gcaggcttat	ttgatgtaat	cttgggtccct	agggcaaatc
60841	ccttgggttt	cgtagtccac	atatttctaa	gatataacct	tctggagttt	ctggggaaag
60901	cctgtgggtc	tcctcaagcc	cttctgactt	aaaggaactc	aaaattcaat	ctgtatcttc
60961	cctgtcatag	gcaacagttg	taatcccttc	tttagcacgt	ttagccttct	agccattact
61021	ccttgctaat	tttccctagga	tctctcccat	atatgtgcag	tttaggggtc	agctaaggat
61081	tttagaRagt	ttatacacag	attttggggc	tcactcctct	gtggcatcct	ccttcttgtg
61141	tttccctttt	caatttcttg	caaccctagc	tgattcaaac	tccatcctct	gacaagttag
61201	tttaataagac	tgactttcta	cttgagctct	gtcgacccca	tccccgctga	actgaagtgg
61261	gtcctcaatg	actaagccta	ataaaggagg	gctctacccS	gtgcagttat	tattttcaag
61321	ggtaccctgc	agtttctgcc	tgctttgggt	tgtctctccag	tcttttctat	atattttttt
61381	caatttgatc	ctgaattttt	aatttttatt	ctgatagggc	tagtccaata	aaagctagta
61441	catctattgt	agaattggaa	taatttctca	aatgctttta	agtaactcaga	aggctagagg
61501	atctaacctt	aattgtttgt	aaggaatgga	gaagagtaga	aataaaaggt	ttcttaaggc
61561	agtggttagg	aaaaataata	agctatttct	atattctata	aaatcctaata	gaatttggct
61621	tatttaatac	ataagttaca	tatagaattg	tattggaaag	cattaatatc	gttattttta
61681	atacaaaatg	ggcaatcgtc	agtcctcttc	cttcttatta	aaaccgtgcc	ccttcattctt
61741	ctattctttt	aaaagtcaca	aattcagtg	tccaccttta	tctttctaag	ggctgtttcc
61801	tgatctgaac	ccagatttagc	aattacgtta	aaattagtgt	aaagaaaagg	cattatacaa
61861	atttattcta	tatagatagt	ggttaaaaatc	cttaatgagt	tattatgcta	ataaactaca

61921	cttgctagat	gcaaatataa	cataaaaagc	attcaaatata	gtatgttgat	gttggttttta
61981	atttggtttta	tgtgctttaca	ctagttagtt	taatttttga	gacttacttt	ttcacctata
62041	aaaatgagga	gtccaagtat	gttaattggt	agatcacttc	caaatactat	gttttgaaaa
62101	tataagttta	tcgtatagca	atcatacaca	agaaatagaa	tggtcttcat	aaacaatcaa
62161	tttcaatgta	Ytatttgcat	gtaagagcat	gtcattattg	tatgataatt	tatagtttag
62221	agggagtcct	tttgcaataa	aaaaattgag	gcttaaagaa	gcagacatat	gattttttaga
62281	cagaaaaaat	ataaaattat	tcattggaac	taggttttta	ttttgttcaa	ccggatattt
62341	agtcactctg	actaggcttc	aggaaaaacta	ttaagcaggt	ggaggagaag	aaacctacaa
62401	aaaagactta	gttgagtag	atagagagat	taaaagaaaa	ttgagaaaaat	gggttgctcat
62461	gaatgccaac	agaaaaataac	atttcaagaa	ggaaagagca	gtcaacatta	gaaaaatgact
62521	atcaagttta	gggtacacaa	cattcccctta	actgtattct	gactgttctc	agtagagatg
62581	taagttataa	tttttaacaa	ttacaaatgt	taattcaatt	acataatgat	actttaataa
62641	aataaccata	aataatttag	ctttccaaga	aaattcatca	tattcaaaact	ttatgaggtg
62701	tattttacccc	tataaaacaa	aattacaccg	ttgaaatggc	ataaaaaatgt	tatgatggag
62761	ctccagaaaa	gcaagcttat	taWtggtatt	atatcttctg	ataatataca	tacttttggtg
62821	aatctaagta	tattttaaat	aaatggtgcc	actaaatctc	tctgtacaag	acagtaagaa
62881	ttttaaaatt	aacaggtata	actcgtgtgc	ctttctaagg	ggctaccaaa	cttaaaagaa
62941	tgtttcacat	agtgaatta	tatatatcat	aatgattatg	caYgtaccat	cacattaaag
63001	aagagtcaaa	gaagaaatgt	tggaaagtga	gctctgaatt	catatgatta	ttccacagtg
63061	attagatctc	atgtagaga	gctttctcat	taaaaccaga	agtcagtggt	ccagtacata
63121	catactttta	agagaggaag	atgcagtcag	agagagagag	aaaatgattg	atatgatgta
63181	catatggagt	ctatttaaaa	actaataata	tagtaaagtc	tcctcaagtc	cttctctgcc
63241	tcactactct	tataattttc	tgcaattaat	gtgttcttaa	aatttatgaa	aacacaaatc
63301	tggcctaaaag	atatgaaaca	gataaatgag	agatatcttc	tgccctagtac	aggagaataa
63361	tttaagggtg	agttaatgta	actgagaaat	tattttctcc	tagtttagaa	gggaagagag
63421	gccacagag	aactttcaat	aagaaataaa	aagtatatca	agtttaggat	agaagtacca
63481	aaaaaattaa	aaacaaagat	aactctgaat	tagatacagt	tggtatgttg	atgatatagt
63541	ttcttctttg	gctggctttc	aagtcagaag	cttttaaaag	ggagtattta	ggggtattag
63601	aagactttcc	aaggccaagc	cagtatatct	agcacagaaa	aatttcaagg	tggtgagtga
63661	cattttgaaa	tagaaactaa	aaacttcctt	tttcatatat	taatttggtt	ggaaaagatt
63721	tctataaagt	aaaaaaatac	agaaattaaa	tcttaatgct	aaactctacc	tcattttaaac
63781	cataaattag	actgacccat	ggatatctaa	attatttttt	taaaaggctc	tatccataac
63841	attgtaagct	gcattttag	taaaacttca	tttttataga	cactgaatcc	atagatcgta
63901	tactaatYga	atcatgactc	aattcagaaa	aaaagatttt	atacctaaaa	ctttatagtc
63961	actggttatt	taaaaaggat	tgtaatttta	atttgatgct	atatttttga	tgcaaaaata
64021	ctttgggtgat	caagaaaaga	ctttcaaaaca	cacattttta	ttgtacttga	attacaattg
64081	tgtagaggKtg	gggcggaata	taaatatagt	tcaagcataa	aataaaatga	tataaatatt
64141	ctacctatta	aagcatgagg	tcaaatcact	atgatattta	gattcttaaca	gatataattt
64201	taaaagtgac	ttgacaatat	tatttttaag	tatcaatatt	tacaacacaa	tatacatatg
64261	tcagtgcgga	cgccactca	ggaaaatgaa	aaccattcct	aaaattttga	aaagaggaga
64321	atttaatat	gtgggttgat	cacaaaggcg	ctagaaggaa	tcaaagagca	aaggatgaac
64381	agagtaggac	attggaagaa	caaaaagaaa	aagtaaaaca	cagatatcaa	gtgttactga
64441	tggtgcagtt	gattgtatct	gccagacgta	tgccccttga	tcagacctgg	aattgccaaa
64501	aagttgctgc	ccgtgcccta	gctgctggga	tcaagaatcg	cctactgcca	ctgctgctgc
64561	agccactgaa	ataaccattt	aaagcagacg	gctcttctct	ttctttttct	gtctgatatc
64621	ttcagtggtt	tccttcaggt	ggaaattatg	gagaagccag	atggcaaagg	agcctgggaa
64681	atctggtttg	cagattccca	tccctataag	gctcacagta	tatagcagag	tagaaaatgg
64741	tatgtatagg	tttaagagaa	aacaggtaat	gatcagta	gtctgcaaat	tgcgcccttt
64801	acaattttct	aaatgattgc	aaaatttaata	tgtaaatatt	aaatgtagaa	agatacatatc
64861	ttaaaaaatt	cctttgggtt	ttatatgaag	aaaaaagcct	gatgggtatt	acaattggag
64921	attttatttta	tataaagaac	Wtgactggtc	gttttggtt	taaaaataat	ctgttccttc
64981	agcctaattt	tacctgagcg	tttccaccac	ctggaaatta	aatctcttca	tgctaactga
65041	ttatcaaatR	ctaaattata	tgacaagaat	tttactcccc	aaggaaaaata	gatccaacaa
65101	tgaagaaag	ccagaaccca	ggaaaaatgga	aaaaaaggag	gaataagtgg	actaaattat
65161	aaatctgtaa	aattaggata	aagtactata	cttagcatgt	aagtattaat	agtgatgttt
65221	ccatgttaaa	atatagcacc	attgagagtc	ctatctctca	atttctaaac	ttctagtata
65281	acactaggct	tttctgttca	ctgtgccac	ccacgtggtt	tcagagagt	aaagaatgtt
65341	tttgaaagta	gacatataat	attggagtat	aataagatac	tatttagtaa	ttataatgcc
65401	aataatgtca	ttttctgaga	aagaaaatgc	tcccaagact	aaacagagta	aatcagctgc
65461	ttgggactac	acagctttcc	taatttttat	ggttgacaca	aagtttgga	attctttagt
65521	tttactaggt	aaatgaattc	ctatgatggg	tatttttagtt	catcaatgca	ttaacaatag

```

65581 aaagcatata tttaccggga ggctttataa atatttttatt ttattattttt atttattttat
65641 ttagagatgg agtcccactc tggtgcccag gctggagttc agtggcgcaa tctcggttgg
65701 ctgcaacctc cgcctcctgg gttcaagcga ctctcctgcc tcagcctccc aagtagctgt
65761 gattacacgc acccaccacc ataccgggct aatttttgta tttttagtag agacagagtt
65821 tcgccatgtt ggccaggatg gtcctgaact cctgacctca ggtgatctgc ccgcctcagc
65881 atcctaaact gctagaatta ctggcatgag ccactgcgcc ctgcctataa atatttcaaa
65941 acatatgccca cttaacatgt gttaatcaca tgccatggtc aaagtgctat ggagggatgc
66001 aagtgtgaat aagacataga cattgatcat gaaaacattt tegtgtatgg ctctatgtgc
66061 tatgcactgt gctaggcact ggagatacaa aacatggttc ttgcccttga
66121 agagatcttg tcttaatgag aaacacagag gttaaactag acacttataa tacaatgcac
66181 taggtgcaat gatagagaag cactaagaaa gcaacaagga aggtagagta aaggtaaatt
66241 tcctgaagga ggagaaatat agcctgatga caaaaataaca ggtagtaatt atctaggtaa
66301 agagggattt agcagaagtg aaggacgtct actgacagac acaagagtag aagtaaaagg
66361 agaagggtta gaaacagcat ggaaagcagg ccaaaattta tgagaatttt gcagctctcc
66421 aagcaaaaaa tgatgagaat ctatcctacc atactaatgt tegtgaagaga atgaaagaca
66481 ggaaatcaga gataaaaagg aggtaggata aacagaattt attggctaaa gtgaggagaa
66541 gggagaagtc tggaataatt catcagttca tagtacaatt acataaaagg gtggttgtgt
66601 aactaattgg gacagagatt gctgaaaaag atttagagga ggaggacagt ttagaatagg
66661 gtgagttgga tatgtagcat tctgaagctc actgtgaaag tgccatagga ggtatacatt
66721 tgggagtcag caacctgtgg gtggtagtgg aaatcatgaa agtacatcag attgccaaaa
66781 agaacacatg gagtaagagg atcactgggc taactcttag atgaaaccca gagaaagctg
66841 tcacttaaga attgacaaaa taagaagaat ttatgaaaaa aaataagaaa gtttcaaaaa
66901 ataagctatg actagcaatg tcagaactat ttgagatggt gatgataaga actgccaaat
66961 gttcactaga ttggccattt gggagttggt ggttaccaa gccagaactc ttttggtagc
67021 atagtgggag aaaaagccag actgcaaaag atgatggaaa aacttggatg tgaaaaggtg
67081 aaaatgacat gcatatgtat tattttttca gaaattttag atggagaggg gaagaaagag
67141 ataataattg gaagggtcat tggtttttgg agagtttttg tttgttttta agttaaaaca
67201 gagacttgag taaaaattata agctaaggaa gaaaaagaaa gaaggaaaat gtaataaag
67261 aaagtcaagt aatatgtgaa ggataaatat cctggaacag attcgaactc atcaaaaatg
67321 attaaactga aaattgattt taatgaggta aagatgttac tttgatactg aatataatat
67381 aatgagaatg tgtatgttaa taatagatag gcaagagaat ggaaaattga caaagatact
67441 tcttctattc ttcaaattta ttgataaaaa ttggagatta cgtatgttga cagtgtggg
67501 gacatgtatt atgtaacagt ctacaggaga gtggtgaaga ttgaaataga cattgaggaa
67561 agggaaaagt actgctaaat cagaacagat aaaagaatag atcagtgcca cttaaagactg
67621 agtggagggt tatatgaaac tgacactttt ttattgctgc tagtttacac aacagtgtga
67681 ctttcttcag ctgagattga tgcccacagt ctaggagcag agatgaaaat gttcatatca
67741 aggttgagac atggtggata aacttggtaa gggaaattaa tgagatgaaa gaagagctaa
67801 aatgattaa gaaagcatagc catgatcaga gacataaact tggataaaat tttggaaatg
67861 ttaattagaa gatcaaatga agttgaaaaa caggtgaagt atgagtgaag aaatgaaaga
67921 gtaggttaga aagacataac cagagactga aatacgaagg ttctagaatt tgaccttgag
67981 gttcatggca gagtgttaga gaaaacaaaa gaaatgagtt taaaatagct caaatggag
68041 tgaggggagg agggatgaat agatgaagca taggggattt tcaggggcaat aaaactattt
68101 tggatgatac tctaattgat gatacactgc tgacattata cacttgtcaa aacctataga
68161 aagaatgaac tctaattgaa actgtacacc ctagttaata atcatgtatt gatattgggt
68221 cattggccag gcaagggtggc tcatgcctgt aatcccaaca ctttgggagg ccaagatggg
68281 aggatccctt gagggccagga gtttgacacc aatctgagca acatagagag acctccacct
68341 ctaaaaaaat aaacattaaa aaaaattagc tagacatggt ggtgcatggc tctagtccga
68401 gctgttgagg aggctgaggt gggaggatcc ctttagctca agagtttgag gctgcagtga
68461 gctgtgatag caccaccgca ctctagcctg gatgacagag tgagatccgt ctccaataat
68521 gattgtaagg ttcattaact gtaacaaatg tacctacca atgcaacata gtaataatag
68581 ggtaaattat tcacactttc tgctcaattt ttctgaaaac ctaaaactgc tttagaaaat
68641 aatatctatc tgaatcatga cccaaaaatga ttgttgtaag gaatatctac attgattctg
68701 aatatatatta ggaggttggg cagtttttgt gtgaagagaa acatttagcc aggtctcaaa
68761 ttttctcagag aaggagaaga agatgctatt gtgaggtttg tctgggtggag gtgatgagac
68821 ctcaagaaagc acatgtaatt gacaacataa aacaaaacaa aacaagaatg gagatagcat
68881 gaatagagtc tcattaataa ataacaaaaa acaggttcct tgagtatcta agaaaggcaa
68941 aattccatgg ccYctaataa atagtgaana tgatggaaga gaattcccac gccatgtcag
69001 ctcaaaaaca gtatattttt tgcccagacc atgctcaagc tcttgccttt tttctatgcc
69061 tcctgtgtct atccccactc ctattgtcta ggatcccgca cactgggtta ttgatgtagc
69121 tagtcatgac acttggtgta tggagttcat ttcaatacc tagtagctaa tgtcaataga
69181 actttcattg attttccagt gtcctttaat tcgttaggta ttgacctttt atttaaatcc

```

69241	cacatgacca	ttccaaacat	tttccacact	tttcaagcct	caattttctag	tcccttcatt
69301	ttttacaccc	tcgtcatggt	cagttgttaa	actctatggt	ttactgcaaa	agctgtgaga
69361	atctagcgta	agtccttctgt	gttcttgata	ttcaacctca	aaatccttcc	atgattctct
69421	catcttttagt	gacatcaaaag	gcatttagtta	tggatactgt	tgacacattt	aatacccatg
69481	tgagcctaata	agagttttga	atcctctctg	agtcacaatg	tccacatcag	tggaatgaag
69541	ctatttgtgaa	gatgaaccaa	gaaaatgaat	tcaagaatgt	gttgaggaa	aaacaaatag
69601	atcttggtgt	atgtgttgac	tcggatagat	tggtaaaact	tcctcagggt	ctgtgtttta
69661	aaaatgtaac	agatccaaca	catatttgga	aggtagtctg	ataggatttg	ctgtggggaa
69721	gtgagagaaa	gaccaaagcc	gagaataatg	gtttccagct	tcattccatgt	ccctaaggag
69781	atatacctaa	tgtaaatgtc	gagttaatgg	ttgcagcaca	ccaacatggc	acatgtatac
69841	atattgtaaca	aacctgcaca	ttgtgcacat	gtaccctaga	acttaaagta	taataaaaaa
69901	atataaaaaa	aatttataaaa	agaccaaagc	caacaatctc	ttctaaactc	atcccttttt
69961	aattttgtct	tttcagccac	agcagcgaaa	aaacaaaaaa	aaaaacaaaa	aaaacagcct
70021	ttattttccat	tttccccagc	tccactcact	atcttggtcc	tagccacaat	tatctcttct
70081	ctggattgta	gcYgtagagg	tccaattact	ctccctttcc	actcttgact	gccttcaata
70141	tatttttaaca	cagcagccag	agtgtaccag	tcattttcct	gctagaagac	ttttgatggg
70201	tttccatccc	actcagagta	aaaactgtcc	ttaaaattgt	ctacataatc	tgcccaatca
70261	attccctttg	tgatctcttt	atctctccct	ctgtcaccat	gctccaagct	tatggtaccc
70321	cttgactctc	cttataactca	ttgaacttgg	ccttttcaat	ttctgtctct	cctatctgcc
70381	taaaatgata	tttctctgtc	cacctcattt	ttttttcagc	atttgcttaa	agcttattag
70441	agaggactgc	cattgccacc	ctcttcaaaa	gaacaacttc	catcctttgt	actacctatc
70501	tctcttattc	tggttttattg	ttttttataa	cacttacaat	tattttatta	tgtactgact
70561	tgttcatttg	tcttctctctg	gtaaaatgta	agctgaagtt	ggtctgagat	ttcatatatt
70621	tggttttacta	ctgaagcctc	aatatctaga	aaatatttgt	acataaaaaga	atgaatgggtg
70681	gccacatggc	atacattagg	taataacact	ccctaattta	ataaccattc	aatgggatct
70741	cattgctctt	taataaaaatc	aattaaacta	ctatagccta	ctaaatttgg	actttatata
70801	aaatgttttt	atctttgttg	aaagactaca	ctttgagctt	ttgttcctat	tatttttaaa
70861	attttgtcca	ttaatataaac	agcttggtat	attcagctac	tctcacttta	cttcaagtta
70921	attgagaatg	gtaccattta	ttggcacaga	agaaatgaat	gaaggaaata	tttggccagg
70981	agttgcagaa	tgcggaatca	aaactactat	tttagaaatc	agtaataata	cccagatgct
71041	attctaaagc	tttacaggta	ttgactcctt	acatgctctt	actaatgtga	tgaaatagat
71101	agttaatatg	cccatttatgt	agatttaaga	catcaaggct	tagagaattt	aaataccttg
71161	ctcaagggtca	catagccaat	aactggaaga	accaggatat	tagcttaaat	tgtttgattc
71221	catttctctta	acaactatgg	atatacctct	ttggagctat	ccaaatggaa	aatgaaataa
71281	gtaactctgat	atatgagtct	ggagttcKgg	taaggatatg	gaatggacac	atgcatttga
71341	ggccagctctg	catatagatg	aagtttaaat	tgcccctcta	ccttcttcta	tccctacttc
71401	tcttttattt	tcagtctctt	tcaaattctt	tgctccttcc	ccatttctta	aaaaaggtat
71461	tctctatctt	gaaaataacc	tgctcatgta	ttctaagcta	aattaattag	gtgtcttttg
71521	ttgcataatga	caatccaatt	gaagtgaaaa	gataatttaa	ttctcacaaa	actggcctat
71581	tcagggatga	gatccaggct	cctttcatca	ggcttttgta	tcgcttgctc	catctctcag
71641	ctgtgatttt	tttgtgtgtg	tggtgcccc	gttctcaggc	aggctctcct	ctcttgccag
71701	ttaaagtgact	tttagtagct	cttaggctta	gatttcatcc	tcttatctat	cccaacataa
71761	acatagattc	tcttttacct	gcagttccaa	tacagagcct	cagctttaac	attcactggc
71821	tctgactatg	aagtattgtg	ttcaagagga	ggcagtggtc	tcaatgccag	gcctacacca
71881	cttgcccagg	tgagcactg	agagtgggg	tagctacacg	caaaacacct	agagcaagcc
71941	tcggggagta	gtgaatccca	aggaaaaagta	ggatgctgtt	atcagaggaa	ggggaagtag
72001	ataccaaaca	ggaaaaacaa	aagatatcct	tcaggggctt	aaaaacaata	gaataagtta
72061	caggaaacta	tcaatagtta	catgtacaca	aaaatttaaa	tcgacagtaa	tacaaaatca
72121	taatgaacta	aattaaacta	caaacaaaa	gctagaaaat	atttgtaaaa	gtgtaatggt
72181	gacttggttg	tgtcaccgct	tcactgctac	atgaagttaa	aatcaacaag	aaaatactaa
72241	gacccactg	gatagatata	aaagatatga	acttagagtt	tcaaaaggag	aaactagtag
72301	gcagtataaa	tccgaaagca	aatatattgc	aatggagaag	ggcagttaat	cattttttag
72361	aaagttaagt	ttatgaaata	tgattgatat	atattttatt	ttacaaaata	atgtaaatgt
72421	gttatatatg	cttggaaatta	ttttatatgt	tgtatttcat	aataaagtag	aacatcacca
72481	gaatttgatg	acatacttgt	catcaataat	agatttgaca	acactgcaat	taacacaaaa
72541	cccacaagga	atttaaaagc	atagcttgaa	actgacaaaa	taacaactat	actagcactg
72601	atataagct	tacttattcc	tgacacagtc	tcacatacta	tgtatttatt	acctctcagt
72661	actcacaatg	ataagtacta	ctattatctc	aatggttag	atgatgaaac	agagagaggt
72721	gaagtaactt	gcccatagtc	acatagccaa	gtttagagaa	attaattatt	caaattcagg
72781	aagtttggt	ccagcatcca	agtgtttaac	tcctttacca	gtttccagag	aaaaacaggt
72841	ttgtctgcaa	agcattttaa	taaaccagct	tacatgtcag	tgagaaaaac	aatactcaaa

72901	cagttcagag	ctgttttttt	ttaaacctgc	atatttgaag	aaggttcaga	taggagttca
72961	gacagagtat	gagtagaaga	caaaacataa	gattacatag	agaaagatWt	gggggtgagat
73021	gtaaaagatt	tgcattttcta	aactttctcga	aattcacact	tctttctcaa	acacctgtgt
73081	cttcttttcca	taaaaaatta	aaacttttag	aaaggactgc	aataactgt	acagtctata
73141	tctcacttcc	ctcttgcaatt	taatcacact	ccatttagat	gacattcagc	tttaattctgc
73201	ctagactgcc	tgtactcact	tcattttctca	accctagcta	aacttgcaact	ttgtcccata
73261	aggcttttcaa	actactccca	tctcttagta	atctcgctct	ctgagaacac	ctattccact
73321	tcttttcaaa	ttacctttgt	gtaatgttac	acatctatct	atataatct	acatctatat
73381	ctataaatgg	gcataataac	aatctcagga	agagagaacg	agagagatgg	agggagagag
73441	agaccttctt	tttgcatagt	ccctgttttg	gaaatcagaa	gactaagggtt	atgtttactt
73501	tgtatgccaa	gcacacagca	gaatgcccta	aattcatcca	tttatctgca	catgtttttg
73561	aatgcatggt	gtattctggg	cactgtgcct	ggcatcatag	atacaaagga	gtggaagata
73621	cttttctctg	gccttcaaa	atctctaaagt	gcacacgaaa	aacaaatgtg	tagataaata
73681	attaaaacac	agtgtagaaa	atgccatagg	gtaatacata	caggggtgcca	tggcaaccca
73741	ggggccgaat	ggcagcttct	gcctggggag	ttgaaaagat	ttcacagaag	aggagaaatt
73801	taagctaggt	cttcagatga	gtaggagtat	aagaggcaac	aatagggata	attataaaag
73861	catgttttgcc	ttgataaata	gtttgcactt	tatcattttag	ccagtacaaa	ttataaaaga
73921	gttttacaaa	agagaaaaat	gtgatttaac	ttacgtttaa	gaaagatagc	tgaggtaggc
73981	ctgagaatgc	attggagtg	gRaagagaaa	aaaacaaatg	gctttttcaa	caatctaggg
74041	aggaataatg	gaatgtctac	attaaaacaa	cagtaacagg	agactaacia	aaagaatgag
74101	tctgaggaaa	gttaatatct	tttattttat	tttattatta	ttatacttta	agttttaggg
74161	tacatgtgca	caatgtgcaa	gtttgttaca	tatgtataca	tgtgccatgt	tgggtgtgctg
74221	cacccattaa	cttgtcattt	agcattaggt	atatctccta	atgtctatccc	tcccccatc
74281	cccaccccca	caaYagtccc	cggagtgtga	tgttcccctt	cccgtgtcca	tgtgttctca
74341	ttgttcaatt	cccacctatg	agtgagaata	tgcggtgttt	ggttttttgt	ccttgtgata
74401	gtttgctgag	aatgatgggt	tccactttca	ttcatgtccc	tacaaaggac	atgaattcat
74461	catttttttat	ggctgcatag	tattccatgg	tgtatatgtg	ccacattttc	ttaatccagt
74521	ctatcgttgt	tggacatttg	ggttggttcc	aagtctttgc	tattgtgaag	agtgagcta
74581	taaacatatg	tgtgcatgtg	tctttatagc	agcatgattt	acaatccttt	gggtatatac
74641	ccagttaatgt	gatggctggg	tcaaattgta	tttctagttc	tagatccctg	aggaatcgcc
74701	acactgactt	ccacattcta	tggcataata	atagaaattg	ataacttgg	ggagaaaaa
74761	aggaagggtt	gagacttgg	gagaaattta	gcagaggaaa	atgagcagat	ggacactcca
74821	caacaaaaat	aggggatgca	gaaggaaaag	cagattggaa	aagggcaaca	gggacacaSa
74881	atttggtctat	agggcattttg	attttgtggt	acctgaggaa	cattctcatg	gaattgtcta
74941	ggaacaatta	gtcagtggag	atctggaacc	caagtgaata	atgttgagaa	tttctaagg
75001	tttaggaaac	ataggtatatt	ccatcacttc	cattataaaa	acttcattgg	gaatgttgg
75061	ttaataggaa	gatcatgcac	agaatgatta	tttaagggtc	taaatgtttc	cacctgagca
75121	tgggtaagg	gaacaggtgt	taattatttt	tgtctcgagg	ggaaataatt	taaaaactag
75181	agggaggaga	gggttaactt	tgggaagaga	gttcagagaa	cctgagaatg	tgatgatttg
75241	tccccctttt	cacccacact	ggagaggggc	atgccagggg	cagttgggaa	ggatcaggca
75301	ttcttcccat	aaagtcgagc	ctatctctct	atgccagcag	aacatgctgc	agggaggcac
75361	aattcccacc	attctgaccc	accatttctt	aggtagtcaa	acttaggggtg	gcaagaacac
75421	ctaagattcc	cacagtctag	agaaggagga	agagctggca	aggacaaa	ccagaggaaa
75481	tggcctcctt	gtgcaggag	agcccaccac	ccactgggat	caggagaagg	tcctgttatg
75541	aggagcaacg	cttgtgaatg	aagaagggtt	ctcagctggg	tgcctgaaa	ccatcaaaaa
75601	tgttccatga	tcacacaaaa	gagtccttaca	tattttcatt	actgcaaacc	agccttgaaa
75661	atatatgtat	gggccaaaga	aactttgccc	accgaagaag	aacctccctg	ctacaacaca
75721	cctgccagtg	actgccagtg	gataaatgct	tgcaggcctt	gtgaaatgag	gagatagctt
75781	tgcaaagggtg	accagagtaa	aatacgtaaa	aagaagggaa	gcccttatag	agactttaaa
75841	ttggacagtg	gctaagactt	tcatttcttac	atgagattaa	acaagtaata	atagacagat
75901	tgagtttccc	agagtatgtc	agctgtacac	aggcagggaag	ttaaaaaaa	tacatgtggt
75961	cataagaata	catgtttgca	cgtctgaatg	gtaagtgttc	aaaatccact	ggatattgat
76021	ataggatgaa	actaaaaat	agatatggga	gatcatacaa	cctgtttgta	tataagtaca
76081	agaggaaaac	atggccaaaa	atatttgggt	ttgataagga	aggattttta	cactaatgaa
76141	ggaaaaggat	aacgagagat	ctgtgaaaag	aaataaatta	tgtagatgca	aatgacttag
76201	tgaatggctg	taggagcaat	tttctaaatt	tgcagggtgat	atttaattgg	cagacatttg
76261	aaacagcaag	gagcaattca	atcagataaa	gaacttgaat	cattaagtac	tggcctaagt
76321	agatggcaag	cgcagataag	tgggtgaataa	taagtcttga	atcaaaaacta	aagaacagag
76381	agtgaacatt	tgccaaagg	aatgatacca	tccagggaatg	gctcttagat	ttaaggagaa
76441	cttatagaca	aggacaaa	aaacttcagt	aaaatattac	aaataaaaag	atttgggtggg
76501	ttacagctta	tccagctgaa	gctgtgatga	gaaaatctga	caacttaagg	atagataaat

76561	cctgaaatcc	acgggttggt	attgaaatcc	catttggtac	ctagaatttc	atctatccct
76621	gatcatgggt	tgagataaaa	attaatgagt	aagataacat	ccaagcatat	aagaggttac
76681	agatttggtg	gaggaatact	taaataactt	ttaaagacat	ttcggatatg	aaattctcta
76741	tggtctatgg	gcataattgt	gaggtattgt	gttttagattg	cttgggtcatt	tttatttaac
76801	atgccagttc	tagtctacgt	tagtctggaa	attataaaca	tagagaaata	tgctacaagt
76861	aaaagagaat	aataaaaaat	tattatagcc	tagaaaaggta	gttgatgcaa	tatataatat
76921	atttcctcct	tctctKtttt	tgcaatgggtg	aatactttac	taaatgaaaa	ggttaatttt
76981	aatattaaag	agaaatggaa	acatccttta	gtacaacatt	aaaaccacaa	atggaacctt
77041	taaatattca	ctcactctag	caatcaatgt	tccaacctca	tttaaaggat	tttttttaac
77101	ttgacataca	aatattcaga	atgaatat	ggaagcagag	ccacgagcca	taccttgaaa
77161	gataactgcg	gacttactct	tgccctgccat	ttggRtactt	cagatttcag	ttgttctaag
77221	tctcaatgat	cctgagtttt	ctttttgtaa	tttggttaatt	ttgtaatggc	aggcttttaa
77281	ataagtaaa	gttttcttaa	ctaagaacaa	aaaaaaatcc	ggagacctaa	caaggctcag
77341	ctgtgtccag	gtaggagatg	actgcagttt	ggcttcagag	gctccctcta	gcagtgtag
77401	gacatctgag	tgtctctcct	actcatttta	tatttcattt	gatactgcac	agaatcacta
77461	ggagaacagc	cagaattgat	ttactttcta	tagagacaaa	ctgtttctgg	gagctagtta
77521	tcttcttatt	aacaaagagc	ttactttccc	ctcccccca	gagctcctaa	aacatctata
77581	taaatgctac	attaagtga	ttctacaatg	attgaaaatt	ttactataat	gaagataaaa
77641	attcactcaa	ttctagtctt	tttatccttg	atttgcat	gaYtgaaatg	tgtatttgca
77701	gtttgggcat	ttcagtcagc	gattgctcct	gtattctttg	cccataagca	gccttcagat
77761	ggcctcttag	aaaattgaag	aagtctctac	atgactggaa	aactctttct	gatggcttgt
77821	ttcttcaaa	atatagcatt	acctcttggg	aattatagaa	acaatatata	ttgttaagcc
77881	tcttctaatt	ctactgtaat	ttataactgg	taactttttc	ccccacttag	cattcaataa
77941	gcattttatt	gggcctaatt	tgtaggtgga	attttggaga	atacataaag	tatagaacac
78001	agagtctctg	ttcttcaaga	gctaagcagc	tctatagaga	agagagagac	agaacgacag
78061	agacagagac	agagagagag	agagaagaga	tcaacacata	tccaccactt	gctttactat
78121	ctatacttca	acttttggtg	gactcatccc	atcttatgga	ttcaattatc	atctataagt
78181	agaccacttc	cccaattggt	tctttaaccc	agacctctca	cctgaactac	aggcttttat
78241	tcttcacaa	gccttcagca	ttttccattt	ctaattgggt	ccYcaaacat	taagtgttca
78301	aaactgaatt	tctgatattca	cccccttccc	Ycatccttgt	ctgttgtagt	gtatggcaac
78361	tccaattttc	aagttaactca	gtgcaaaacc	tttgagttgt	ccttgaaattc	tcttctctct
78421	gtcacgcctt	atatacaatg	catcagcaaa	tttgtctggc	tgtaaatctg	aaatatacca
78481	taaatataaa	tacgatcact	tctcaccact	cgaagccac	tatttttctc	tctttaggac
78541	tatttcaatt	gccctttaa	tgctcaccaa	gctactgctc	tttttccctat	ttctgttaaa
78601	aaatctattt	ttaacagagc	agccaaagtg	attgttttaa	aatgtcagat	cgtattacac
78661	tctccctata	accctccaat	agttttcctt	caactcta	ttacataatt	ccctataatg
78721	ccttatatgt	tcaattatat	acatatatac	ttaccaccat	ctctgtgaaa	tctctttctc
78781	ctacttccct	agtatgagta	ttgcttaggt	ataaatcaga	actcagaaaa	ataagagtaa
78841	gaattaaaaa	ggacatatgt	gctgaaaaaa	atagagcaat	gaataaatac	tggggaaagta
78901	attagaagga	agagattata	cagaaaccat	aaggcaaaaa	gttaatcaaa	tttatcaagc
78961	atattatagg	ggacatggcc	aactccacaa	tttgttcacc	tataatctca	ggcaagctat
79021	ttaccttgct	tgagtcttag	atttgccctc	agcgaaagga	aagtgggtgat	acatcatgag
79081	cagggttgca	gcacagctgg	cajaaaatgga	ggtttatccc	acacatgtgg	gctgaaaaata
79141	ttagaatcca	agctaccaag	gtcagagtgc	ctggctaaga	gcttcatatg	gaaaaaaaac
79201	ctttaagtca	atgacaaaa	gggagagact	tttttttttc	aggcagtata	tagccaagaa
79261	tctattcctt	gaatgctgga	attgaagggt	atataaaaagc	acttattact	accaaattgc
79321	aaagaacaa	cagagcaagt	aagttgagag	agagagagag	aSatctttct	tggagaacat
79381	ttttggaaaa	tgactgtggg	caaagcaatg	tgaaaatatt	tagggagaca	gaagactacg
79441	aagataaaat	acctatatca	agaagtttat	attgaaaattg	agaatataaa	acagatatta
79501	tgggataagt	cccataggag	agatacagaa	aaacagagaa	atgaaggata	actgtaaact
79561	ctagggaggg	aatgtcacaa	actcagtgga	aaatacatta	gaaaaggaaa	actaggtatt
79621	tttcagtata	tataatcagg	ctggaagata	aaagctggtt	cagagactag	tgaaaacaaa
79681	tcaggctgga	agataaaaagc	tggttcagag	actagtga	actaaattgt	tcctataagg
79741	actttaaaag	gagatcagca	tgtagtaga	cttgagggcc	tgctaaagag	ggagctagga
79801	gaaggaatag	cacgtgggtt	ctgagaaaca	gtgtagcaat	aaggcttatc	acacataaac
79861	taactaatc	atgatgtttt	tgctactatt	gtgctgtcag	agaaaaaaat	ctattgaaat
79921	aatgaaacat	actaattttg	agaaacatca	gtgtggcaaa	acccaagaaa	cacttttcaa
79981	atgaatatac	tcaaattgca	agatcaaaaca	tctattaatt	ataataggta	agaaaaagga
80041	aaacttcaaa	aaagtctctc	aaagcgaaaa	tatgtaaatt	agagtacctt	cataatcaat
80101	aaacacttat	tgagcatcta	ttcatgtgct	atcaatgtgt	taaaaaataca	aaagtgcacaa
80161	aaataattat	tgctcaaaat	tctgtgcagt	atttagaaaag	attgggtagg	gataaacatg

80221	tatttctcta	agattacatt	acattatgat	aagggttatg	gaaaaaatgt	acatacctat
80281	gtatatgtaa	aaatagaaaa	gagtctaaaa	gaactttttc	aatctcaaaa	cagtgtttac
80341	atatgaggaa	atgtagYgat	gactgttcat	tgttlataaa	tatctgttct	ctcctttctt
80401	agtaatacag	ctcctgaatc	ataatagcca	gatacagact	tcccacaata	tgaatttccc
80461	agtttctctc	cttagctagt	gtggtcatgt	gactaaattg	tagccaatga	tatttaagca
80521	gaaatatcat	gtgatgcctc	tgagaaatgt	tcttaaagga	aggattttta	ttcttattct
80581	tatcttctctc	ctttcttctg	gctggaatgt	taataggatg	actgtgtgtc	aagcagccct
80641	ctaaagacat	gaRttggaag	ctatgtactg	aggagcacag	agcaacaaga	gaaaaaagt
80701	aaaataagtt	tggttcttag	ctctggaagc	gtgataaacc	tgggatagtc	agccagggaa
80761	cttctttcat	gttgattttt	aagccagtga	tattttgggc	atcttcttta	cctgcaggaa
80821	gaaaataggc	tgattttatR	taatttgacc	ctttaaaaac	tagaatatat	tcatacatag
80881	tttttacagt	tcagtgttta	aacttattta	tttttcatct	tagttttgct	tcctatggt
80941	ttgtaaatgt	taaacttatt	agccattctg	tggtatataa	aagtttcact	tttatgtttt
81001	gtttttatat	tggtcccaact	tccatgttca	gctaaataca	ctaacataat	ttaaattact
81061	gcatttcatt	gggaatccaa	gttagaaaa	tccttttccc	acatttttaa	tacctaaac
81121	ttgggaaatg	aataacatta	taagtacttg	aaaataatat	tcactgattt	atcatgtgta
81181	agccctgtcg	aaatatttat	ttctacttga	gcttggaaga	tattttaaaa	tgattccatt
81241	aaagaaattt	ttaaaatttt	tgaaatatct	atttacttaa	gatgttgaag	aaaacataag
81301	catctacctt	taccttccat	tttttagatc	tcatatgata	tgacaaataa	atagaaaatt
81361	agaggaaaat	ttacaacagt	actctaaatt	aagtaagggt	accctccatg	aaccaggaat
81421	tggcagattt	caaaaaagca	cactcctaag	aaatttctgt	ttttcacgtg	accctgacaa
81481	aatccattaa	ttgtccta	ttggaagggt	acaaactgca	gaaaagagca	gggtattagc
81541	tcagcaggaa	gcataatatt	tcattgcca	gttgctgttg	tgactcagta	gcagaccttc
81601	tgttatcttc	tgcatggctc	ctcactcttc	agcgagcaaa	ttaggactca	ttcacattgt
81661	gatccagggt	tcctggcaca	gcaagataga	tggaagcca	ttgtgccagc	cctccaatgc
81721	tctgtttgta	tcacattgct	tttctcccat	tgatcaaaagc	aagtctcctg	ctaattccaa
81781	agtttaaagga	tagggaaaata	gactgcacca	attgttgga	gagctgaaca	gtacattgca
81841	aaagggcagg	aataccagaa	taggaagaac	ttgtggcta	tcttatgtaa	tctgccgtgc
81901	tgatcagtta	gactaataaa	ccaagagaag	aaatgaagga	taataaattc	aaatacctaa
81961	tagagatcag	gctgttaagg	tataaaagta	aagttgggta	tagtacctat	gcacacaaatg
82021	tgcttgaatt	gtgagagcta	aagtgaattg	aagatctcat	gaactttcca	agggggcact
82081	gtctctcaaa	ttcaacaagt	tgcttgaaac	agactccagc	aattttcaca	tgaaattgta
82141	agtttgaatt	tctatgtaga	ctctactaat	tttgaattct	ggctgaagta	ttttaaaact
82201	gtgggtgaag	ataaccacat	ctgtaagtta	cttatgaatc	atggaccatc	aacatgtgag
82261	ttttgataga	gaagactgaa	aggataacat	tttacaactc	tattaaatat	aatataaata
82321	gtacaattaa	tatatatttt	atataaattt	gtgtcctata	gacactgaag	acccataggt
82381	taattacaaa	aattgataat	acatcatgtg	cctccaactc	caaaaattat	atacaacata
82441	agtaatacct	aacaaattac	cagattaaaa	cacaataaaa	ttaaagtga	taacatttta
82501	aacaaagaca	aaatctcaaa	ccacttgga	gtaaaaatag	caaatgagca	aaaactctca
82561	tacactgttc	ctagagcaaa	gaggaaataa	aaactaaaag	tatagactat	ttagaaaata
82621	atgataacaa	aagcactaca	tgtaaatgt	ttttaaaact	ttgcttacag	aaacgtgttc
82681	atcttttaac	tctactta	tactaaatta	aaataatgaa	tcaagccttc	aactcaataa
82741	acaaaatatg	aagccattaa	agcttgagtt	aaaatgcatt	aaaatctgta	ttttagaatt
82801	cataaatcaa	tagggttaat	tgaagggaaa	aaacagttct	ttgaaaagat	ataaaacaaa
82861	aacaagcctt	gggcatgtct	ggttttggaa	aatgaaatgc	ataaataaaa	gtatcaaaaa
82921	catgtgtaca	ccacaattaa	gaaaaatttt	cacaagcatg	atggaacagt	aagtacaact
82981	ttatcgta	tatttgaaag	aaacgtatgg	catgaattat	tatcaaggaa	aacatcccat
83041	cattaaaatt	gaccaagaa	gaaatagaag	acaattaaat	atatgtccaa	tatgacaaaa
83101	aatgttattt	gtttacaaac	aaattaataa	tgttatctcc	tgctgtttt	cttaatttca
83161	ggaagagta	ggccaaatga	ttaagacatt	tcataaaagt	taYccaatta	attctgaaga
83221	gctagagtaa	ttcccaaaag	aatggctgaa	aatgaaatca	catacaaaaa	aagaaaaaac
83281	attcaatatc	actttagtag	tggttaataa	aatacttatt	aagtataat	tgaattcttt
83341	tacaaaattc	ttttggatat	gaatatccaa	aaatcttaaa	tgctctttca	tatttaatcc
83401	gtcagcatat	tagaacatag	taaagtatta	ccaaacaggg	tttattacag	aatgagcttc
83461	attcaaccaa	aagataacag	gagaatcttt	ggcaaaatat	ctaatagtaa	gcaaagtgg
83521	agacatggat	tagataataa	tatgaaatca	tcattgtgtc	taaaaatgaa	agaatggtat
83581	taaaaaatca	aaggaaaagg	ggaaaatagg	ggaaaatagg	atatcgta	gcactttagg
83641	gaataagtgg	aagtaacaga	ttttatttaa	aattttcaaa	acgttaactg	gaaaaaaagg
83701	agtaaaagca	taataaaatt	tttaaatatt	gaggttaaaa	actataataa	aagtgcacat
83761	ctttctagat	agtaaaagaa	aaacctacca	aagaaaacat	gctacataga	aaaacacagt
83821	aaatataaca	aaatctacac	aataataaat	aacataaaga	atagattaaa	taagatacat

83881	ttttgggata	tggatcaaac	actacaccct	cataatatgc	cattttctca	agcatacatg
83941	gaacattgac	aaaagtcaat	catatatgtg	ttggcctcaa	agaaaacact	attaagttcc
84001	atttaagtac	tttattacaa	atagtgttcc	ctcatcaaaa	tacaataaaa	ctagaaattt
84061	agaagaacag	taagagaagg	cttttcacct	gaaathtaaga	aatcatcatg	ttaaacaact
84121	gtagaaaaga	gaaaaagaaa	caaaaattat	ctttaaatt	agtggtaata	aaaatacat
84181	atatcagaat	ctgtaaagga	tacttaaaag	cgtaattagt	agtcttggcc	ctccccttcc
84241	cttcccttcc	cttcccttcc	cttcccttcc	cttcccttcc	cttcccttcc	cttcccttcc
84301	cttcccttcc	cttcccttcc	cttcccttcc	cttcccttcc	cttcccttcc	cttcccttcc
84361	cttcccttcc	cttcccttcc	cttcccttcc	cttcccttcc	cttcccttcc	cttcccttcc
84421	cttcccttcc	cttcccttcc	cttcccttcc	cttcccttcc	cttcccttcc	cttcccttcc
84481	tttagcattt	cttcaatcct	tacttttctc	caagcaaac	tggaatcttt	acattgtaat
84541	attattttaa	agccaaataa	aatcaataaa	tatttaagaa	aactatcaag	aaatttcaaa
84601	tatttacaaa	aatttattct	cttgaacagc	aagagaagga	aacagtttag	taagttagat
84661	aggcagaagt	agacctagta	cttgtgaaat	gtgtgccaaa	actcttcagt	aactattttc
84721	cttctgcttt	ctgtagaaaa	tatttaaaag	tgaatgaaa	gcatttctctg	aagtgtacg
84781	tgaattacta	caagcaatat	gtacaaaaca	tgaaaaacag	agggtgatatt	tagtttgtaa
84841	ttgtcatatt	caaaatcaga	aataaaattt	tcattctgat	agagcagtga	gtttgatttt
84901	attctcagat	taaattacag	aatggattat	taatcagatg	tgtttttagat	gattaaaata
84961	gcagttcatg	tttttgatag	cattagctat	tcaggatcaa	atgaatatct	gattaaatat
85021	gtattttgag	ttcaataatg	cctttttaca	agcactttta	accctataga	caaacgtggc
85081	ttgatggcag	tgtagtaagg	aataatttata	ggtgattgaa	aagctatatc	taaagtttta
85141	actagtgage	tatcatcaaa	gtgcatagaa	ctttagaggc	atattgccat	actttgaact
85201	tgccaatgta	tgtttcatca	atactttact	agtaatgtga	atgaagaatt	aaaggcttgc
85261	tcctcaactt	ctgaatggct	caaactgggt	aaaataaagt	tgacataatg	aatgagaagt
85321	atagattaca	gtagatgtga	aaaatacaaa	agaaccaaag	aatgaaatta	aagagacaaa
85381	tataaaatct	aacatttgct	tcaaYtgcat	aagactttgt	gggctactag	tttgatagt
85441	tttattttta	aaatattttt	aaaattttat	ttgaccttaa	atthagcata	aggcagattt
85501	aaaaatcacc	taataaaaat	gatacagcct	ccaattttat	ttaaaaagt	tataatttat
85561	atcaattgag	gaaactgatt	atttagactg	tggtcacag	agaatgacaa	gtatttttag
85621	ggacagaaaa	tcatatcttt	ggaaaaagt	tgaaagcttg	tcatagggca	gatctattta
85681	gattgataac	ataatgtatg	gatgacaaaa	ctaaaacatc	taataaagag	tacagggag
85741	caggtattga	ttcattataa	aatcaaaagt	ttataataat	tagaatattt	caaatgcaaa
85801	attttcatct	tagaaaaagc	aactggactt	ggtgtaatgt	taaaataatg	catgtaaaac
85861	acattgatact	tggtatatag	taagcactaa	ctaaatgcat	actattaatc	ttaccaatat
85921	aatgtttcta	gcattatatt	caagaataaa	ttagatcttt	agttgttaca	tataatcatt
85981	tatttttagat	ttaaatttaga	gtaaatgtat	ttcaatttgt	ctaagcttct	aagattcagt
86041	gattatattg	cttattagtc	atgctccatt	gtatcatcca	tccatatact	tttcatgact
86101	tgagagaagt	caaactctgt	atcttctctc	aaggaaaaata	ttatgactat	ataattaaaa
86161	taatttttaa	aatgtattta	tattccagtt	ttagtgttag	tcctaataca	aattttaaata
86221	atcatttttac	aataaaatatt	tgacataata	tattttgttaa	tatatgtaat	tttctatagt
86281	agatgcctaa	ttatcttagc	tatttgcaaa	taatgtaagt	gtaaatatac	tgataaatca
86341	agaaccttac	tttaattatt	gacataatta	ttcaggatat	taatctttta	tcattgtctat
86401	aaaacagtca	attttcatat	tgccattttc	tttttattat	Ktaaaatacct	ctctctgttg
86461	ggaatgcaga	caaaaagatg	gaagagattt	ataataatta	ggtaatatata	gttttagtagg
86521	ggctccatct	ttatttatcc	atatattcat	agcaagtatt	tattgacctat	gaattctatg
86581	ccagaaaaatg	tgatatgtaa	ttttttttaa	agtcacaatc	cttgctttca	tgagacttat
86641	ggcctagtgg	aggagtcaaa	cattattgaa	aagatcatat	aaacatatgt	aagattgcag
86701	ctgtcatagt	ggctaggaaa	gtgaggaatg	taaacttctg	atagtgtaaa	caaattattg
86761	ttccaatcaa	agagatagtg	gatagcttcc	ctgtgaaaat	gaaaatcaag	ctgacatata
86821	gatataaatg	agtgtttact	tgaagtttca	ggagggtcaa	tccagactgt	gggaacagca
86881	tgtacaaaaga	ccatgcatca	ggaagaactg	ctggaaggga	aaatggtaca	gtatgaatat
86941	gttgaaagcag	gttggggata	gcctacRtaa	aggtgtgtag	accatgtttt	taatctttct
87001	cctaagagcc	atgcaaatc	attgaaaatt	tttaaagtgt	ggcaggagac	aggatcagat
87061	ttgtcttata	gaaagactac	tttggtctaca	ataggagagc	tgaagaggaa	gaaaggtaga
87121	Yttcaggtag	tcttacaagg	agctggagcc	taggaaaaaca	atgaaagctg	gaaatagttaa
87181	agaaatgaat	ggatattagg	atgctcagga	ggtaaaatca	ataatgatag	atttgatagg
87241	gggcataggc	tgagagaagt	aatgaagcta	acaagtttta	tgacttatat	aaaaagacac
87301	catttaaagca	agagatgttg	gaagaggact	ggttgaatat	cataagtatg	atgttggcca
87361	tgttaaatgt	taaatttgag	gtatttttaa	gtcatttagt	agaaatgtca	attatgtagt
87421	tgaataaatc	agtctagatc	ccagagctca	gatacacatc	tagaaataat	acatttgtaa
87481	attgtgtgta	gatggggaca	atagcagtaa	tgaacacaga	tggaattgcc	taggcagaa

P A T E N T
Docket SEQ-4095-PV

87541	agctcaaagt	agaaaaggat	gtaggcccaa	gtccagagaa	ctgctaacat	gagcttgaaa
87601	aaggaactga	gaaagagggt	tatgttatgt	catgaaattc	aagggaaggt	tgtgtttgtg
87661	atggaggagg	aaatcatcaa	tgctaaatgt	caagagacct	gatttagatga	gctttgaagt
87721	atatccacta	cgttcaacaa	tacaataatt	aagaagtact	ttttccatga	ggaatagggt
87781	atccaacaat	atggggaaaa	agagttttct	cagagtgaact	gggatataata	aaaatggaga
87841	gaaaatgtgg	taatgtggag	taaccagaga	gtagaggga	gggctcaatc	tctttgattt
87901	cattttaaca	agaaacaaag	aattcttttaa	tgggaaatct	agttaatagg	atgatgttga
87961	atgcattgaga	caggaaactta	agtatctgaa	atagagagag	attgatacat	ttaatgatgg
88021	aagggttagcc	ttaggaaagg	ggacagctcc	tgtattgtgg	aagcagataa	atagagttaga
88081	ctgggtatgg	gctataggtt	ggaacacaga	aataagtatg	atttttaatc	tccatcttc
88141	tatgttctct	atataataac	agtaggatta	aagatgtgac	aagtcgttgt	aaaaagtggga
88201	caagtgaagt	gaccaaataa	ataaaaaacct	aagaagggtta	agaataaata	attgtctttg
88261	attattttctg	gttatgttgt	ttattgat	ttaggaaagt	ttagaactgt	ctttctgaat
88321	tagtggctct	tggtcttttt	ttttttatta	tactttaagt	tttagggtag	atgtgcacaa
88381	tgtcagggtt	agttacatat	gtatacatgt	gccatgttgg	tgtgctgcac	ccagtaactc
88441	gtcattttaac	attagatata	tctccaaatg	ctatccctcc	ccctccccc	acccacacac
88501	agggcccggt	gtgtgatgtt	cgcttctctg	tgtccatgtg	ttctcatgtg	tcaattccca
88561	cctatgagtg	agaacatgag	gtgtttgtgt	ttctgtcctt	gcttggcctt	tttttaaat
88621	ttgcttcagt	gcagcacctc	taataataagt	aaggactacc	acatactcat	tatccattac
88681	agtgttctgc	tgtatcattg	attctgaagg	atggagtga	gcacctcttt	aggaagacta
88741	tacaaaactc	agagatggga	aagagagaga	gagagagaga	gagagagaga	gagagagaga
88801	gagagtgtgt	gtatttgtaa	gaaaaagttc	attatatgat	tctgatatgc	ctccacagg
88861	gaggctagaa	atttctcctt	gaaaatagaa	tagccaaatg	ttgaaaatag	accagaattt
88921	aggaatttgt	ttatagatat	atgacaagta	attgttaaat	ttataaata	gtgtagcaca
88981	tacaaaataa	cagctccctt	ttcctaataa	aaaaacttta	gctattttta	ttctatttta
89041	aaaattcact	tcgtgatatt	taagggtatc	cattattaaa	atcagtaacc	attccaattt
89101	ataatcattt	aaaagtaaaa	catataatta	tttattagaa	aaatatttgt	gaacatttta
89161	taaaattatt	caacatgttg	tcaagtaaat	cctcctcagg	tggaaatttc	tgactttgtg
89221	tgagtcatta	aatgttttgg	gtcactagt	atcaattagt	aaattactga	tccatagtac
89281	tttaattggc	tgaaaaagta	aatgcactct	ctgagcacct	aattgaaatc	tagttattta
89341	ttcatcatta	aaatcaagat	aatgagtc	gctcacata	atgaaactga	acagttacat
89401	tcattttcaca	aatagattaa	actaaagctc	agaaaagacg	ggacaaggga	gttaaacatc
89461	cagggttagat	tttccatctg	aaaagaccca	attcccaata	tcttgctata	aaaattaaat
89521	acatatatga	gtttgaaagc	aatatttttc	tgcaagttca	ttttcatata	gcgttatata
89581	gtttaatacc	attcagttaa	taattgtaga	tccatgRtac	gtataactaa	atggctttgt
89641	tataatgtaa	atagtacagt	ttaaacagca	aaatttcaca	ctgttttaat	ataaaaaatt
89701	tcctagaacc	aattaccctg	agtgcctact	atatggttca	tttggaataa	gaatgatagc
89761	tgcaatattg	taaaatgatt	atgagcacag	ccttcggaat	aagtaaaaca	tagctttta
89821	attcaacttc	tgtacttact	aactgagatc	tgaacaagtt	acttaacttc	ctaaggttta
89881	gtttctccac	ttacgaaatg	gagaggaaaa	cacataattc	atagttcatt	gtaaggacta
89941	agtaaaaaaa	aatacttaaa	tacttagcac	agggcctagc	aacaaaagata	tatgaactcg
90001	gtacacacag	acatacaaac	acgtaccac	actgcttaac	tttagctaga	atatttttaa
90061	aagcattatt	agtttgagac	tagatttcac	caagttggtt	tagcattcta	ctagggatgt
90121	tacttttcat	atcttttctt	gtttttgttc	ccaaaagcta	taaacacaag	ttttatcttc
90181	tttcttgaaa	caattaaaaa	gaaaatacaa	gaaaatgttc	aaaaataaat	ttactagtgt
90241	ttttgtttgt	ctggaagggt	catcctgcag	ctttaatcac	agctgaagat	cattatttca
90301	aaaaagacac	atctttttaga	tattttaaata	tgtattatca	tattatgcag	tttaaatgtg
90361	aagtcattcta	ccctctggtt	tactgagatt	ctgttacatt	ttaaataaat	agtaaatgct
90421	gtagttaaga	gtgctatcac	tgagaatcta	agaagacaca	ttagaagggt	attattactc
90481	caagaagaat	tctctttcct	taatcattac	tttttcatta	aaatatctct	gaagtttata
90541	caatacaaat	atagtagtga	ccttaggcat	atgacacctt	agtgtataaa	aaactctaac
90601	aaatctgttt	agagcccaat	aatataaaat	tctgtgaaga	gaaatataaa	ccaatggtaa
90661	aatgccatgt	tgaagtttct	aaatagccca	cctagtaatt	tacatgttaa	gaacatattg
90721	aatatcttgg	gaacatgttc	ctagaaaaga	ttctccatta	taagcttttc	ctttactgtt
90781	aatgattgct	ttgataaaat	gaccacagaa	aaaagacaat	tttctccctg	tgttatctgt
90841	gtctgaaata	ttcttctactg	attttacata	tgctgataat	atgaacaagg	taatttgtct
90901	gactctggtg	gggcaagatt	ttcagtaaga	aatgcaaaat	tcacacatag	ctcttctgta
90961	agaagtctWt	gcagtgttct	agttttatata	aaaagattta	tattgctgga	ggcatctatt
91021	tttttttctt	cgaggcaagc	tgaagtggca	caaatgaaat	tgtttttcac	actgttaatg
91081	tattcctttc	tctttcaatt	tctcagagag	ccgacatagg	gatttctgct	ttaaccatca
91141	ctccagatcg	tgaaaatgtg	gtggacttta	cgacacgtta	catggactac	tcagtggggg

91201	tactacttcg	aagggctgaa	aagacagtgg	atatgtttgc	ctgtcttgca	ccatttgatc
91261	tctctctatg	ggcttgcatt	gctggcacag	tccttctggg	gggtctactg	gtctacctct
91321	tgaaactggc	taatccccc	cgattacaaa	tgggatcaat	gacgtctact	actctctaca
91381	actccatgtg	gtttgtgtat	ggatcctttg	tacaacaagg	taaggagcaa	aagtacattc
91441	tagtatttaa	aaaaaataga	atgtgatgtt	tccaaagcca	tgtattcagt	taataaggtt
91501	ctgtatctga	catcaataag	tggttctaaag	ggacttcaca	gaaatgctca	gaaaagaaca
91561	tttgctactt	cctcctagtg	gatctcagac	acaccaagtt	tccagcaata	atgggttcatt
91621	gtcttttgat	gtaagtttaa	tttcatcaac	aaaggcaaat	gtgaatgtca	aaggtaaagc
91681	tcacagaaaa	catcaagatc	agattttcct	ctccaaactc	tgactttctg	agaaatagcc
91741	ttataaggat	gaaattactt	attaccagag	aaggctactat	tttaattattt	acatatgtaa
91801	gaaatggttag	gacttgttct	ttgttcagag	acattatttc	atgcattaaa	aatattgtca
91861	ttgaaaagac	tttggttaat	ttgagactga	tgagaaattt	tgtgttttat	cttttacttt
91921	gatagttaat	ctttactggg	gatttaactt	acaatttcac	tattttctaa	agaatgtcat
91981	tgctctgtta	tttaatatcc	aatctgccca	actctttaaa	cttgtccaat	taattattttg
92041	gctctcactg	tttcaaaaata	gaataatatt	tattgcatc	cttacttgag	actattgcct
92101	catagagaat	gaaatagtaa	gaaaattgat	agtctcttgc	aagctctaca	catatattga
92161	agaggaggat	gtttgctaca	atggagacat	tatacttttg	tgctaataatt	tacaactctc
92221	aataacatct	ttctttttat	tcctattttc	tcttggaact	tccatttaac	ttcatttttc
92281	tattctaatt	taatcaaaaga	ttagtctaga	accttcatct	gacttgctaa	cttctaattct
92341	agcccttaaa	ccttttgtaa	gcatgctttt	ccctccaccc	ttccatatcc	agggtcttaa
92401	gcttacctgt	tactgtatat	ttttcacaga	cacttttagt	tctttcatta	ataattaaatt
92461	cagttaaata	ttaatccaca	ctatctaagt	agaactttcc	taagcaatta	gtgtatgatg
92521	gtgagcaaga	aggtctttgc	catcattgcg	ccacaacaga	agtctaata	gacacaaaca
92581	tgtaaacaca	ggattacaat	tgtgggtaga	aagtctctgt	gtaggataag	catagactgt
92641	taggagatca	taggtgtaga	agcacttaat	atatgttaat	gtcgcagaga	aggcttttta
92701	aagtaacact	ttatacagag	agacagagtt	aactatggaa	agtgtctctt	gaggaagatg
92761	aatggagaaa	aggagacata	aacgggttag	atggaatttc	agaccaagaa	gtgagagaga
92821	aattaaagata	gtccaagcag	agaggatcta	gtaaagatga	ggctgaagct	acatttgcta
92881	ttataaggag	tttgaactga	tccttgaaat	gatcagatat	ttaaagataa	taaattgggaa
92941	aatacagatt	caaatttttac	tctagaaata	ttctggttat	aatgtggaga	atagattgaa
93001	aaaaggcaat	gtgaaaagtc	agacaaatta	gaagactatt	acaataactg	agcaaagagt
93061	tgatgtggct	tgctcaaagg	taaggtagct	ttgggagtc	agaggagagt	attgatgaaa
93121	tggaatcaac	aggctttgat	tacctatagc	gtggtgtggg	ggtcagtact	gaagaaaaaa
93181	ggagataaag	ttttatccta	ggtttttgaa	tagaaaaatta	tgtatatagg	atgtggatct
93241	catttactga	aaaaataaaa	cagaaaaaac	agatatgaca	ggagagatga	tacattcatt
93301	ctgtgcaca	ttgagtttga	gctatccgtg	aaacatccaa	aagagtatta	ctaattgtgtg
93361	cttagtgggt	tgatatattt	gtcagatgca	cagaagagac	atctggactt	aatatatatt
93421	taggagatat	tggaatgtag	gaaattttga	agacatggga	gttaatgaga	tcacacagag
93481	tagtgtgctt	taattgcaaa	ctcctgattg	aggaccactg	gcccatacaa	agcctaggac
93541	agagctctaa	ggaaaaggaat	ggatagagga	gcactcagtg	gtgcctgata	aggagtgaact
93601	ataaatgcac	aagtgaanaat	cagagcagct	agtagtatac	gtttggttga	ctgtgttaaa
93661	cctttcaaag	aatcaaatga	aattaaggct	tgaagggttt	ttgttggaat	taacaataaa
93721	tttattattg	aagcaaaaaa	ggcttgtctt	tgccctatga	tgtctgaggt	ttcagctaga
93781	caattcagag	gccagaggct	aaaatcatcc	aaaggcttgt	tcatttcact	cacatgtctg
93841	gtggttgatg	cggctgtgtg	gctagtggcc	tcagcttttt	ctccatttgg	gcctctccat
93901	gaggtcactt	tgcatgggat	agtttgactt	tctcacagca	tggtagtgtc	tttctccaca
93961	gagaacatcc	caattaaaga	attttatgtt	ccagggttggg	agtcataaac	ttgtgtgatg
94021	gtgtgaattc	ctcttgacaga	gaacatcctg	gatgtaccca	cctcatgggt	ttttatgaga
94081	atttattaat	gaatgggttaa	aattgtgaag	ttcttagata	taacttatat	aagtgtcaca
94141	taagtgttta	ctaaataaat	aaaacaatga	attagactca	gcggcagata	attgacatat
94201	gtaaaaaaag	ggataacaag	acaaatgatt	gtagatcatt	ttgatgtasa	tattgattga
94261	aatagtagat	catgggggat	atggagaact	agaaagagaa	ggaccaagaa	tgcgaaatgta
94321	aagaagagta	agggtagaaa	ttgatagagt	aggcctggca	tggtggcaca	tgccagcact
94381	ttgggaggcc	gaggcaggcg	gatcacctga	ggtcaggagt	tcgagaccag	cccggccaac
94441	atggtgaaac	accatctctg	ctaaaaatac	aaaaaaatgc	caggcatggg	gggtggcgcc
94501	tgtaatccca	gctactcagg	aggctgaggc	tggagaattg	cttgaaacca	ggagcgggag
94561	gttcagatga	gccgagattg	tgccattgca	ctccagccgg	gatgacaaga	gtgaaactcc
94621	atctcaaaaa	aaaaaaaaaa	aaaaaaaaaa	aagatagagt	agttaggaga	gagtgtaga
94681	ggtctcaata	agattacaga	aaaagagtga	aaacataatt	ataaatgagt	ttggagtctg
94741	tattttataaa	ataggacatc	taagcctaatt	tttttttgaa	atgtaataga	ggagaacatg
94801	ttgtaggtat	gtggatacaa	attccagatg	ttaagatttg	gtgaaggact	tcaaagctga

P A T E N T
Docket SEQ-4095-PV

94861	tcaaggaact	gagagataaa	gggttaggtg	agccagctgt	aatgatggct	tggtattagac
94921	tgagagaaaa	gaaattgagc	catgtgtcaa	agttgtgaat	aaataaggaa	ggatgacaag
94981	gatgttgata	gatatgagca	ttgaccagaa	ataggagggtg	acatacctag	atataattaa
95041	cctctgtttt	catcttactt	cttccaattt	attcagtttt	tcagtgtatg	atttcaacaa
95101	ctgccaatat	gctgatgact	cccagatcta	catcatctat	tcttgaactt	cagatttgta
95161	tattcaactg	ttacctaggc	aactctctga	ctataccaga	ggcaccataa	atttgaacat
95221	gccaaaaatg	taattcattt	tagaatttga	accttcttag	cctctcacat	tctctattcc
95281	agctgatcca	ccaccaacca	ttcagactca	tgttagaaac	tctgaaaata	gttttcattt
95341	cttctctctt	ctcatcttgt	atatccaacc	ataatcaagt	cctgtcaatt	ttaccactta
95401	aatattttcta	gaagtggaaa	tctcttctta	tctagaaaga	ttagcctaga	ttgtcaccta
95461	gattgaggct	acctcatttt	tcacctgaac	tataggagtc	tcataagtct	ttcttcttcc
95521	agtgttgtct	cctgcaaaata	tacgattcac	atacttgcac	atatacccaa	gttatccatg
95581	ccatggaaag	ataaacacac	aattccattt	cttcagttat	tttcttggct	tcccaatgcc
95641	cacagtttag	aagtctgagt	tcttcagagc	ataaacaata	ttccatcacc	tggtcctgtg
95701	ccaacactca	gttctcatct	cttaccattc	gtgcctcaca	tttaattgcc	cagttactcc
95761	aaacttacgg	tttgaccata	agacaagact	ctttcctaac	tcttcacctt	Kgtatctgtc
95821	ctttccaatt	ccttgagtgc	ctttgttacc	aactcgatta	gactctactc	ccactctctg
95881	tctttataca	gcaagttcct	attcatcctc	taattttttg	cttttatctt	tctactttca
95941	agaagtcttt	cctgggattg	agaaccatct	tctatactcc	tcaacatgta	tttgtcatag
96001	tacttaccaa	ccatagtgtg	attccttttt	ttaaacaatg	ctccacctga	gtcctttgaa
96061	tataagatag	tgtactattt	aatctgtgta	gtctctttgc	ttatagttaa	gtgccttgta
96121	catgttaggc	atttaataaa	ttcatattga	ttaaattaat	gaatggatgc	taaatactta
96181	actaaataaa	gcatggaggt	tagctgcaat	attttgttta	ttagattata	gtctcaataa
96241	aaacactaaa	attatccaca	aatgacttaa	aactcactaa	acaaaaaaga	aattttctctg
96301	taatgtcccc	actgagttgt	tgtaagaaac	taagaggagt	ttataagtaa	ggcatcctct
96361	tggttgaagc	ctcattttgt	aagacgttga	catacttatg	aattggcttt	ctgaattctt
96421	cctccaagtg	accaaatttc	aataagtttt	ggagcacacc	caggaaaaaa	gataaataga
96481	attaccata	tggttagcat	gcttttctag	ttctataaac	atgcaacaga	taacaaaagt
96541	tataaatatg	ttaaatacct	ttctatccca	ctgctccctt	aaatgagttg	cacagcctgc
96601	aggttgattg	tacattttata	caaattttata	atgacagata	atgctgaatc	gcatatgatt
96661	agctacttca	tctttgaaaa	gctgctattM	ttccacttgc	taacaatgaa	aaggtgaatt
96721	cattaaaaga	Yactgagagc	atctttatgc	tctgattaaa	aataaatgaa	gaaaaggctt
96781	ataaacctca	tgaaaaagag	aataaatcaa	tgacagtgtc	catgtatagg	caattgactt
96841	ggaactgggt	atatttccaa	taaaaataca	gtcttttaag	aggaagtaca	gctgttattt
96901	cagaattgca	gtcttcattg	agccactata	ccagattgaa	tagggataaa	gaggcatttc
96961	atgtgttatc	agacagattt	ctaaaaaaag	agttcacgga	cagccaaaaag	cagaaaaatg
97021	ttaaatatat	gtgagttgtt	tactaatcct	gacattttta	aaaatctgta	acttcaaagc
97081	attctggaag	aatagctcag	ggaatccaac	tgtgcaaaag	cagtatgggtc	cattatagag
97141	ataaactcag	tacatctgtt	tggtctggaac	attaagagct	tgtgaattag	gttgtaaaat
97201	gcacgaatga	gagaccaatt	ttatacaact	tttgttgtca	ttttatgtcc	tccgttatct
97261	ccatgtStac	atacatctcc	tttcaattaa	tattcttaag	tgaaactgga	tttgattttt
97321	agaagtctct	tatgtttagt	ttattggcag	tgactctatc	atctgggtctc	cagaggactt
97381	caatgacttt	gcaaatgtag	ttgtatgtaa	tttKctttct	gtttacatgc	aaagggaat
97441	ttcagaatta	tcttcagatg	tttgtgtctg	attatgggaa	atagaaatat	ttatagtcat
97501	gtaaaaatatt	tgaagcaacc	acatatatgt	ttatttagca	gcaagcattt	attaagcacc
97561	aacaatgtgc	caggaacatg	agtagcaaaa	ggaaaaataag	gaataactct	taactagggg
97621	ttaataaata	tttcacgagt	atactatgtg			

Following is a genomic nucleotide sequence of a *PDE4D* region (SEQ ID NO: 4).

>5:58309301-58408050

```

1      ctctaaatat tttccattga tgaatttcta attgtttttg gcctaagtag tctgaaaaca
61     atacacagat ttaggggttc aactaaaaaa acgggaggat ttctaagtga atgcttttga
121    atcctttgtt ctcattatac atcagaatgt ctgtgtacag cagttaaggc ataaaggaaa
181    gtaaaaaatgc agttgaatct caatactgta ttttgctttt cagaactgca attcttcaat
241    ttacattaSg catttaagat tgttcaggaa gcaaaactaaa ataataaaac aaaatgtcct
301    taaatgtaat ctcctttact tctacatcac gccagtggtc tactgggtat attatatatc
361    ctcccaatat atatttaagg aggtggtatg ggtccaatag taagaaaatt ttcttatttt
421    ttcctgacaa tattctgcta aaaatcattt gaatatgctg cactgtgatg cattacaagt
481    ttggtagata tcagtattca aagttattta aacaaatact ccattgatgg tataaaaaata
541    aaWccttcaa aatgcataag accaaatata tctatatattg ctatttttac atgttttttaa
601    aggtacagta ttaaacataa agctgtccag gaaaaatttt cctcaaaaag aaacgtacta
661    aaattctata tgtagattct tggcaatatt gttcataatc atagtacaaa tgggtcataa
721    tcacagtaca aatgtgaagc ccttcaaaaa taacatcagt tgtgagctgg ctaaaagcta
781    ggagctgaat tctggcggat aatgagggtc tcttatattt actctctata ctttctcgca
841    tttctgaaga tttttagcca agaaatggct aacaaaattc aaataatgga agtctatata
901    ttttaaaaac atttttaaaa atctgaatca tccacagatt taaagggagg taaggaaatca
961    tgactacttg gaYaaccaag actgaaataa gtttttctaat ttttttagaa tcaagttaa
1021   tctctaaaaa aaaggggaac ttgtccttca aaaagaaaaga aacaaagcaa acgacRaaca
1081   ctccaatctg aaaaatcctc agagtaacag aaaatgaatc ttttaaaatg tgttgtgatt
1141   ggctcccagg ttcaagcgag tggctcaaat accaaaaatc tgtgaagtga tgtttcattt
1201   aggactgaat aaggtttttc tacctccttc tattgtggag acaggatcac aatgtcaatg
1261   ttaccacagg gcatgSaaaa agcctgccaa gcatggacac aatcttattg aattgtttat
1321   taattcattt cttgagattc acaaaaacagt gtaataaaaa ctttgttcag ttttgcaagt
1381   ataatagaca atcaagtttt cacttttagt tcaattacat agttaagtaa tgtcaatttt
1441   taatgtcacc tagggcttta tagctaaagg tgaaaaaaac gtattcctcg tcaggttaaa
1501   ttagtataga tttttagaaa gagccacaaa ttaattttat aaactttatg tgcaacatac
1561   taactggaaat ccataaatca gtataagtaa tttggcccRa taattttattt gcaatgaatg
1621   tatttaatta ccataatatt ttcaagcaca attcaaacat ataccacatg acaaacagaa
1681   gaactactgc gtatctaaaa aagctatttt aacactcaaa ctacaactga tgaagttat
1741   acaatcttat cttgaccact attaacacgt atttcttcct agttcatgtg taaggaaaga
1801   atacataact gatagtttga acaaattaca gttagagtcta agctttctaa ataattttgt
1861   aatcagagta aggagttttc aaaagctaag taagtcttac ctttatgtag cccaagaca
1921   ctgacagtaa atagtttgct tcaggcattt ttgattgatt atatgtatat atatatatat
1981   gtatatatat agtaagctct aaaatgtatt tagcttcaaa atctcgacac ttaaacacc
2041   tccacaagcc acgcagagta tgagttttta aagatttttg gtaattaaat atacataaga
2101   aagcctcgca ttaaatccca tccagccgtc ttcccacga atacatgcc a tttgtgaagc
2161   tccagaatgg cacaaaattc agcaactatt ctgaataaag aaaaatccacg tgataaagga
2221   atatctaaag atctaagggt ctgcatcttt ctctcccag ctccagggtc taatgaataa
2281   tgtatgtcaa gatgcttagt tgcaagaaag gctagtcctg tcaaaagcta ccaaataagg
2341   aactgcaggg aagcgggaa gagtgacaag aagcccctcc cataaaaccc caactctgca
2401   ccaattgcat tccagctctt agcctataag gcgaggggtt gtggcctcg tgcaggctgc
2461   tttgggattg gttggcaagg gccagcctct ggggagggtt tctcctcacc cgacaaacgc
2521   cattgaataa tggatccct gcagctctga ggccaccctg agaaaagatg aacggggctt
2581   ccctcttgca gtgatgaata atgaccataa aactcctcaa aattcgtagt tcattcttaa
2641   gaattgccca tccttttgga gggcattttc tatgaatttt aatgtcctct ggcttcctt
2701   ccttccaaat aaaaactgct ccaaaaatgg caatcgagca ttttaattgc ttccYtctct
2761   caaatccaaa acaagtggct ccctggtgat gtagaaatga ctgtagttct cccctcatcc
2821   aacataaaaag catagggatt aaacaatacg actaatgtcc agaattcaca gatggcacag
2881   atggcaatga cacattccct cacctgtgtg Scatggctgc tctcagctcc tttgtttct
2941   attgttatgt atgacagagt tctaaaacct tcaaaatcta ggggtgggac cacttgcatt
3001   tctgggggga gggaaatgtg aaagctaggg cactgtgtat gcataaggaa tgcagtgttt
3061   tgtatataga actcaggatc tgtattttga tcagaagaga atattttatt tatttttta
3121   gagacagagt ctcgctgtcg cccaggctag agtgagtag tgcgatcttg gctcactgtc
3181   acctctgcct cccgggttca agcgattctc ctgcctcagc ctcccgagaa gctgggatta
3241   caggcgccca ccaccacgcc tggctaattt ttgtattttt agcagagacg ggatttcacc
3301   atgttggcca ggctggtctc aaactcctga cctcaggga tctgcccacc tcagcctccc

```

```

3361 aaagtgcgtg gattacaggt gtgagccaac gtgcccagcc agaacagaac attttaataa
3421 ctgtacacaa agttaagaaa ggaatgagtg gctcttagga atccagaatt gagctcaaga
3481 gtaatcagac attttacgag gaggggttaaa tgagaaatca aagttctttc tagaaaaaca
3541 gcatttttcta tttgggtttg tgtagtatta ccctgtaact ttaatactaa agaggtcttg
3601 tgggtgagaa acaaggaaaa actaggtttt agttgatttt agcatataat tctgtgcatt
3661 ttacctctct tccattctcaa agcctgtgct tactactctg tgctttaact tgctggtatg
3721 gctactctgc agtcttctct acattttaact attccacat gtggcatgtc tgtcttagag
3781 agcatgctct ctgataagca ctccctgtaac actgtgtctc tctgagtttc tattggcctt
3841 tagctgctac agtcctctgc ttttggttaac atctgttgta ttcattttcca tccactctac
3901 tcctctacaa aaggaagaaa ttaaagctcc aacattccac taaagctacc cccagaggaa
3961 tactaaggtc ctccctttct ctgggtctccc tacttctctg aagtgttcca catgtttgat
4021 cattcctact actctccctc aactcccagg atcctgaact tctttaattt tccctaggcc
4081 cacaatcttc aatgaccact tctaacttga acttcagtgc cataatttctg aatacaagat
4141 tctcctctcg aatgccctgc tagtcacgac aaactttttc aaaactgtga gacatttttc
4201 tatttaaaagt agttcttagt ataattactt ccatttcagt cagtgagcct atatttcttc
4261 cagtatctca gatggaatct atgactcttt cctaccattc aacagggtgt tcatgtgcgt
4321 cagacactgc caggtgttta atataaacca tctagctgaa tccttgagta acccgcatg
4381 ttcccttata cggcatcacc ttccctcctt cattcaactt tgtagcaag ccctatcttt
4441 tatccagagc tgtttctttc agtttRtcc ttaccattac ccctcccgta atctgaatcc
4501 aaatatttaa aagactgaga gaaatagaaa gtaactttaa tatcaccccc tctaactccc
4561 tcatattccac ataaagttga gacctagaga gaaaaaatga ttttccagg ttcactctgg
4621 tactgagaac aagaattgca agtttaaatc tttgtgcac aatcactgac aaataatctt
4681 tttagtgtgt cagcttctct atctgtaaaag tggattactg tggcagctag tctccaaaga
4741 tactcttaat gagccacact gtcctacact gaactctgag tggctgtgtt aaccaacaag
4801 tgatgggtgca tgactgctga ggctaagtca taagaaatct tgcagctctc atcctgctt
4861 ctttgaatgt gctattggga cccctaagcc attaggttga aaaaaaaaaa ggtctgacta
4921 ctctgagagg ctatgctaca agaagtcctat gttaacttca cagacagtga agagagaaag
4981 cgcaagagag cacttgacaca agaaagagca cacatgcctg gccagtcttc agcaatgcca
5041 gccaccccag cccagagcca gacctgaggg gcaagaagcc atcctagcca tccagccagt
5101 tcagctttca gatagctacc cactgggctg caaccatag aggaatgcca agcaagaatg
5161 tctagccaag accagttaac ccacaaagcc atgaaaacta ataaaaatac attcatattt
5221 caaagtatta ggtttgaagt gatttcttac atagcaataa ataaccagaa cagatacata
5281 tgaggattaa atgagaccat atatgcaaag cacttaaaac aacaaatggt acaaagtga
5341 agataagtag gtatcagaca gtaaagatga cagtgcacat gatcattatg ataatcattc
5401 tattatacta atatttaaaa aaattctctg gtttgtcat tgtttttaa atatatgtt
5461 tatatttctt ttcaattgca tcacagcact ccatgtctca gggccaaaat gctgtaatg
5521 cttcttagct catctctctg cccctggctt ttccctctt agtctcatat tgacctctac
5581 tgccagatca attttctca aatccagccg cagcctgtta cttcaaagct agtaatgcct
5641 gctcatcacc atccctctgt aaattccaga ctgccatate tgaccttaat cccaacgcc
5701 aagcctatit tcagctgctc tattacattt gctctgttcc tgaaagacta gtaYtctcc
5761 aYcttcacca tacagctgac aatcccatct ctgtcttacc aaattctcgg cctaaaatac
5821 cctccttctt ctactctgcc aacctcaaac tggttttctc agtcagattt aaatcattca
5881 aagtacatct taggacaaaa tattccagcc tttttccaaa ttctaacgat tctacatctg
5941 ccccttcatt caatatttat taagctYcta cYctatgtca ggcactgcct gagaaagaga
6001 aacaaagctt tctcacctgc agcttatatt ccaaaactaa gtttaataat acataatacg
6061 tcatgggtg ataagcaciaa tggagagaaa gaagggataa ggattacgga tagaggttgc
6121 tataaggtag tcatggaaaag cccctctgat gagatgacgt ataccaggag atctgaagaa
6181 aggaaacaag ccatgtggat tgcggggtga gaggtagggt agagaaggga aaaccaagtg
6241 aggaatggca aaagcaaagg cctcagggca aaacatactt ggtgaggctc cctgaagaac
6301 aggtggaagt gtcataccac ttgtcattta aatgcataat acactctgca gtcaggctca
6361 ctgccttccc cctcctttta aaaaaaaaaN atccatccat ccatcaattt tattctttga
6421 caaacttaag actcagttac tttttacttt ttataacaag tattcatcct gaaatgaaat
6481 tcctaaatac acttcttcca taatactgta ctgaatacat ataggctaaa tactccctac
6541 atgattttta aaaaaaaatc agtataattg cttatcagtg aaataaagga gaaatgagta
6601 atttctatca aatactacaa aatataaata cttgtacaca actacatttt aaaaagttagt
6661 caaaaaactac tataactgat tagctgtgtg acctggggga agctatttaa atttcccata
6721 cttcagttta ctcacatgga aatgagaat aatagtttct accttacagg ttgtgtgtga
6781 ggattaaatt agtgcataata cataaggctc ttagaacagt aagtgcatac taagggtttg
6841 ctatgatttc tcttatgggg agaattacca caaaagtaac agtagcatga aaatgaatac
6901 aggggtgtta tgttagaaaa attttccttt ttccctgat atgaatgat tctttgaaag
6961 gtttcaaatg taacaaagt ccaYcttcac aatatacact attgctgcat tactagaaaa

```

7021	tttgggtgtg	attaaaacca	tgtaaaaata	tttaatactt	atacgtaaaa	agtagttggg
7081	ttctaggctc	agagaattat	aaatgcattt	tggtttttca	cctatgtgaa	tagctgctgg
7141	gacttttttg	agttgtgtg	ggacacacag	caaacctccc	tggtgaaagg	ctgtcccatg
7201	tatcccagga	catctagcct	ccctggcctc	tgcyacacaa	gcaccaggag	tactccccag
7261	tcactgtccc	ctgaaatttc	ctgaatgttc	cccagtggtt	agaatcactg	ttctattttt
7321	ttcaactgtc	ttcaactttg	actcctcatc	cagggtggag	gatcctttgag	gccagaaaag
7381	tatcttatta	tgtccctgta	tttctcaagg	tagtgtacta	ttgccacaaa	aagattgttg
7441	gctgatgcag	atgcaaaaaca	tcaatatattt	tatactgatt	ataggtgaca	ggaaaaggaca
7501	agggttttca	ccctcagcaa	aatcatcaaa	aacattttaa	acagattaca	tatagttagat
7561	aatactcctt	gtcttaaaac	attatgcaga	aacacacata	cagtttccct	tccctctaaa
7621	atctgcagcc	tcttctccct	gctgaatgtg	agtgatggtc	ccttcattca	acagacttct
7681	atttggcaac	tattatgtgc	caggcattct	aatagggtgct	ggatgtgaaa	ggatttaact
7741	tattcaaata	agtccctaata	ttgctgcaat	aaggagagatt	atttaatcat	attgagtaaa
7801	aagtaccaag	gaaagtttcc	atatttctag	ggaataagaa	atcttttcaa	aaatctctga
7861	gccaaattaa	aattcatttc	attttcccta	atctccattt	ctaggagact	agaatctcct
7921	tcctattgcc	acggtagctg	ctatctgcag	agagaatcta	gataatttag	aagagaaatt
7981	tgaatagagc	cagagagata	caattcttat	agtcagactt	ggcttcacca	aatttaattga
8041	agaaacttta	ataagttaca	acatttacta	ggcacctact	atgcacaaag	aactttacat
8101	acctcatttc	taatcttggc	aacattctga	taagataaat	attatcccta	ttttaacatg
8161	aaaagatgga	ccttcttaca	tattcaataa	cttgcKccat	aggtgacagg	attgaaatgc
8221	aaaccagtc	cttgctctta	atggtgtatg	acagctcatc	atataattag	gctgatgcaa
8281	actctatgat	aaacagtatg	aatctaggag	tggatttgtt	tatcctcaat	ctttttgcta
8341	actttacagt	gccttgaatt	aaagaatcRt	ggttactatc	accatgggtca	gatctctgga
8401	cagggtgag	aagcaggtgc	ccacaggcag	acagccctgc	catatagtga	gacacgctta
8461	tgtttgggag	cgctatgtga	acaacacaca	gctgccctca	tatgcagatg	taatgatgac
8521	gacacattca	gacaaggaac	tgaggtccag	aaaagtctcg	acaacacaa	ttgaggggaca
8581	gcgttacagc	tagagctcag	gtttcttatc	tgtaatccac	tgctctcaaa	tgcccaaatg
8641	attttatata	catatatgca	agtggttttg	ttgaaataga	aaaaatagtt	tcttggcctg
8701	gtgaagtgcc	tcatgcctgt	aatcccaaca	ttttgggagg	ccaatgcggg	aggattgctt
8761	gaggccagga	ggtcgagacc	agcctgggca	acatagagaa	accaccgtct	ctacaaaaaa
8821	tttaaaaaatt	agccaggtgt	gggtggcatgt	gcttgtagtt	ccagatacta	ctgaggtggg
8881	aggtgggag	tgctgaggtg	ggaggtgggc	ttgaggccag	gagtttaagg	ctgcagtgag
8941	ctatgattgc	accactgtac	tccagcctgg	atgacagagc	aagaccttgt	ctcaaaaaag
9001	aaaaaaaaaa	ttcccataat	gttcagttag	ttctcttttt	cagacttttc	ctagaaatac
9061	ccctcagaat	ttctagaggc	cacttccctg	ctattccttg	ttttctcagt	ccttaccaga
9121	tacccaagca	attaacaatc	tttttgaact	atttcagtag	atttcaggat	atttgaaatt
9181	ctgctgatgg	agctgaactg	ctgatacatt	aacacatgct	gtcattattg	actttgtaac
9241	agaggtcaag	agagaaaaaga	tgcatttttg	aataggga	aaacaaaacta	aattatgggg
9301	aaactaaggc	tcagagaggt	caagttgtct	tgctcaagg	caacaaagcca	gtagttaagta
9361	acagggccag	gatttgaacc	cagactgtct	ggtttcagag	tactctaaat	tgccaaaaaa
9421	agaaaaactat	ttcaggcatt	attttatatt	tagcctagag	cctacataat	agatccgtta
9481	atataatcaa	ttctaagctg	tatatataat	tactgtgttt	gaaatattta	agaaatattg
9541	tttaaaaataa	gtgtattagc	tcttRgacct	ctccaacata	aggagttttc	caggcagtag
9601	cactgtttgc	agtaggactt	acattattgg	aaaatatttt	atcctataat	caatctacat
9661	ttatttttaca	cctttcacct	taaaattaaa	agtcgtggta	gttattaatc	aagaagcaaa
9721	tctatataac	gtggtctctc	atatatccag	tactgttcag	cttgaacaaa	tgcaaatcta
9781	attttttaaat	gtcccttgaa	gaattctgag	gcaaagttaa	acttcaagta	ttaaacagaa
9841	tagccacaga	aaactagtgt	ttctcagcct	ccctttgctt	tcaaatgcct	taaaaatatt
9901	ttagaggcag	acaataatct	agaattgatt	cataaccaat	attttacata	acagaatggt
9961	acatgtattt	tcatattata	aaaactatac	tttctttgat	taatgctagt	attctgaaaa
10021	catcgttagt	gccagtaaat	ccactaaatc	tgtttgtatt	tactgccctc	tagtgataat
10081	ggctctacat	ttgattaaga	aaaaactatt	cctttcagta	aatgaaaaaca	tctcttgtaa
10141	gtttttatgga	gatttgagat	taagaggaa	tccaggctgc	ttttttaaaa	ccaaataatc
10201	atctgaacaa	gctgagaatc	gttctctaaa	tgatcttatt	ttaatttttt	tttaacaaaa
10261	aagtctcatt	taaaatagta	aacacctgca	acatgtatgg	agaaaggaaa	ccatttttgc
10321	taagaggctc	cttgaagctg	aaataacatg	agactgatct	gatagctgta	tttatatttc
10381	tcttctacat	gggctaactc	tcttattaga	tgtagcata	gtattctgta	attgttgata
10441	cagtttgaat	tcatatatgg	tagagacaga	gttttgtata	actatttagt	caatttacct
10501	aaaaccagca	gcagcagcat	atctactaca	gacttttgtt	tcactgaaga	ataatcatga
10561	caataaatgg	gtgcaaaaac	ttcacataaa	tgaagcctcc	acaaaaataa	tcttgtagta
10621	aaaagtattg	tctccttata	gagaaaaatta	ggatctccaa	ttcacttaaa	ttggccataa

10681	tgaataccat	aatcatcata	aaatagttac	taatgtcccc	tctgtacttc	gtggatgct
10741	ttgtggaaac	aatttaaaca	aagagaatat	ctgtctccta	aagtaataat	aactagtgtg
10801	aataggcatg	cttccagaaa	tatatatact	tttacacata	tcactttaat	atgtgcatct
10861	taaaataatt	ttaagtaata	aaatttgagc	tataaaagag	aaatgatatt	cttttcaaca
10921	aagaatgctt	gaacaattga	gcattccactc	ataaaacaag	aaacttcaac	ctttatcctg
10981	caccacacta	acatctactt	gaaatgaatc	atagaactaa	atgtaaaatc	taaaactaaa
11041	gaacttctag	aagaaaacac	agtagaaagt	agttgtgata	ttgYgttagg	caaagatttc
11101	ttaaaccaca	aaagcatgaa	gcataaaata	aaaaatggta	tactggactt	taYcaaat
11161	ctctttgaaa	aaaactgtta	agaaaaYaga	acaacaagcc	acagacttga	gaagggaata
11221	tgtacaaaat	gcatacaaaa	ttaaaggactt	gtatccagaa	attatttttt	aaaaaatctt
11281	tacaacacaR	taagaggaca	atccagtgaa	aagatggtca	aaagatttga	acaaacaaac
11341	acttcataag	aatcaaaaag	atcaataaagc	atgtgaaaag	atccaYgacc	atcattagac
11401	attagggaag	caaaaagtaa	aaccacagtg	agatgccaca	Ytacataact	actagaatgt
11461	ataaaataca	aaatacaaac	aatacaaaat	gctggcctgg	atgcagagca	aattaaattc
11521	tcatacatgt	ctagtggaga	tgcaaaatgg	tatagaaact	ttggaaaaag	gtttgacagt
11581	ttcttataaa	gttaaaaagt	agagtgaaca	tatgaccagc	caatcctact	tctaagtatc
11641	taccatgag	aaatgaaaac	atatgtctat	ataaagacct	atatgaaaat	gtttatagca
11701	actctctata	gcagaaaccc	agaaacagtt	cagatatcag	tcaactgggtg	aatgggtaaa
11761	caaattgtgt	ccataaaatg	acatactgga	aaaaaatgaa	atactaaaaa	gcaataaaat
11821	gaacacaaat	accaatagat	gcaataaacac	aaaatgtatt	ataagtgaag	cttataattc
11881	aactcaaaac	tcaaaagtat	tgtaagtga	agaagccatt	cacaaaaggc	tatatcttta
11941	atgtattatt	cattctggca	aggcaaaacc	atagggacaa	tcagcactgg	acgtgggggt
12001	tggggaatga	ctataaaaaag	caagagaaaa	ctttttgggt	ggtataaata	tcctatatta
12061	tatagtacat	atatattata	attacacatt	acctatata	ctagattatg	gtgggtggtt
12121	tccaattgta	cacatttgtg	aaaatgcatt	caactatacc	tctagaaaga	gtaactctta
12181	tgtaaattat	acctcaaaaa	tctaactttg	aaaaatatta	gctgatgtta	tcaaatattt
12241	tcaattccag	atttgcctaa	ctttacaact	ttggcccaaag	ataaatgcaa	aacaaaaaac
12301	taggcctatg	ttatgtatga	taaaacacca	tttttaccct	ttcaaaagagc	tccaccatta
12361	tttccagaa	aaYaggcata	cagttatcca	aggtccacat	tagctttaat	gatacaacat
12421	tcagtgaatt	cccagttgtg	aaaagccttt	aggttggcag	ggcgtgtgtg	ctcatgcctg
12481	taactcctag	actttaggag	gccgaggcag	gcagattgcc	tgagctcagg	agtttgagat
12541	cagcctcgcc	aatatgggtg	aaccctgtct	ctactaaaaa	tacaaaaaat	tagcaggggtg
12601	tKgtgggtga	ctcatgtaat	cccagctact	cgggaggctg	aggcaggaga	attgcttgag
12661	ccggggaggc	agaagttgca	gtgagctgag	atcgcgccac	tgcaactccag	ccgggggtgac
12721	agagattctg	tctccaaaaa	taaaataata	agagaagcct	ttaggtgata	aaataatagt
12781	caaagtattc	ttttaagtat	tattatttta	ttttttttta	attctttgtg	ataaaaagtt
12841	ccataaagta	aaatattgtc	cttttttgtt	ttatttttat	ttgtatcaat	tcaaggggac
12901	aggtgcagtt	tgttacctgg	acctgatatt	taaaataaatc	aaactcagtt	tagttatttc
12961	atgtgtgatt	tggtgagctg	ttgtgcagtc	atcatcgaa	agcgaatgag	tatcctttgt
13021	atgctcattc	taggctgtaa	gtaccatgtc	agctgatgga	gacacaaaaa	tccaataaag
13081	taggtatagc	tggtgggagg	tccaagatgg	ccaaatagga	acagctccag	tctactgctc
13141	ccagcatgag	tgatgcagaa	gacgggtgat	ttctgcattt	ccaactgagc	tttgaaaaga
13201	gtagtggatc	tcccagcatg	aagtttgaga	tctgagaatg	gacacactgc	ttcctcaagc
13261	gggtccctga	cccccgagta	gcctaactgg	gaggcacctc	ccagtagggg	ccaactgaca
13321	cctcatagag	ccagatgccc	ctctgagatg	aagcttccag	aggaaggatc	aggtagctac
13381	atttggcgtt	ctgcaatatt	tcgggttcgg	cagcctctgc	tggtgatacc	caggcaaaac
13441	gggtctggag	tggaacctca	gcaaactcga	acagacccac	agctgagggt	cctgactggt
13501	agaaggaaaa	ctaacaacaa	gaaaggcat	ccacacccaa	accccatatg	tacgtacca
13561	tcatcaaaag	caaaggtag	ataaaaccac	aaagatgggg	agaaaccaga	gcagaaaagc
13621	tgaaagttct	aaaaatcaga	gctcctcttc	tcctccaaag	gaatgcagct	cctcaccagc
13681	aacggaacaa	agctggacag	agaatgactt	tgacaagctg	agagaagaag	gcttcagacg
13741	atgggttaata	aacttttccg	agStaaagga	ggatgttcaa	acccatcgca	aagaagctaa
13801	aaaacttgaa	aaaagattag	acaaatgggt	aactagaata	accagcatag	agaagacctt
13861	aaatgacctg	atggagctga	aaacatggc	atgagaacta	catgatgcac	tcacaagttt
13921	cagtagccaa	ttccatcaac	tggaagaaag	ggtatcagtg	attgaagatg	aatgaatga
13981	aatgaatgaa	atgaagcaag	aagagaagtt	tagagaaaaa	agagtaaaaa	taaatgaaca
14041	aagcctccaa	gaaatatggg	actatgtgaa	aagaccaa	ctacatctga	ttggtgtacc
14101	tgaaagtgat	gggagaatgg	aaccaagttg	gaaaacactc	tgaggatgat	tatccaggag
14161	aaattcccca	acctagcaag	gcaggccaac	attcaaattc	cagaaataca	gagaatgcca
14221	cgaagatact	cctcaagaag	agcaactcca	agacacataa	ttgtcagatt	caccaaaagt
14281	gaaatgaagg	aaaaaatgtt	aagggcagcc	agagagaaag	gtcgggttac	ccacaaaggg

14341	aagcccatca	gacttacagc	tgatctctca	gcagaaactc	tataagccag	aagagagtgg
14401	gggccaatat	tcaacattct	taaaggaaag	aattttcaac	tcagaatttc	ataccagcc
14461	aaactaagct	tcacaggtga	aggagaaata	aatccttta	cagacaagca	aatgctgaga
14521	ttttgtcacc	accaggcctg	ccttacaga	gctcctgaag	gaagcactaa	acatggaaag
14581	gaacaaccag	taccagctac	tgcaaaaaca	tgcaaaattg	taaagaccat	caaggctagg
14641	aagaaactgc	atcaactaat	gggcaaaata	accagctaac	atcataaaga	caggatcaaa
14701	ttcccacata	acaatattaa	ccttatatgt	aaatgggcta	aatgttccaa	ttaaaaaaca
14761	cagactagca	aattggataa	agagtcaaga	cccatcagtg	cgctgtattc	aggagaccca
14821	tctcacatgc	agagagacac	ataggctcaa	aataaaggga	tggaggaaga	tctaccagc
14881	aaatagaaaa	caaaaaaag	caggggttgc	aatcctagtc	tctgataaaa	cagacttttaa
14941	accaacaaag	atcagaagag	acaaagaagg	ccattacaaa	atggtaaagg	gatcaattca
15001	acaagaagag	ctaactatcc	taaatatata	tgacccaat	acaggagcac	ccagattcat
15061	aaagcaagct	cttagagacc	tactaagaga	cttagacttc	tacacaataa	taatgggaga
15121	ctttaacacc	ccactgtcaa	cattagacag	atcaacgaga	cagaaaatta	acaaggatat
15181	ccaggaattg	aactcagctc	tgcaacaagg	ggacctaata	gacatctaca	gaactctcca
15241	cccaaatca	acagaacata	cattcttctc	agcaccacat	cacagttatt	ccaaaactga
15301	ccacatagtt	ggaagttaaag	cactcctcag	caaatgtaat	agaacagaaa	ttataacaaa
15361	ttttctctca	gaccacagtg	caaagtagaa	gttgggatta	agaaactcat	tcaaaaccac
15421	tcaactacat	ggaaactgaa	caacctgctc	ctgaatgact	actgggtaca	taatgcgatg
15481	aaggcagaaa	taaagatggt	ctttgaaacc	aatgagaaca	agacacaac	atactagaat
15541	ctctgtgaca	cattttaaagc	agtgtgtaga	gggaaattta	tagcactaag	tgcccacaag
15601	agaagcagg	aaagatctaa	aattgacacc	ctaaccatcac	aattaaacga	actagaaaag
15661	caagagcaaa	tacattcaaa	agctagcaga	aggcaagaaa	taactaagat	cagagcagaa
15721	ctgaaggaga	tagagacaca	aaaaaacctt	caaaaaaatc	aatgagtcca	ggagctgggt
15781	ttttgaaaag	atcaacaaaa	ttgatagacc	actagcaaga	ctaataaaga	agaaatgaga
15841	gaagaatcaa	atagatgcaa	taaaaatga	taaaggggat	accaccacca	atccccaga
15901	gatacaaat	accatcagag	aataacacct	ctacacaaat	aaactagaaa	atctagaaga
15961	aatggataaa	ttcctggaca	catgcaccct	ccaagacta	aatcaggaag	aagttgatac
16021	cctgaataga	ccaataacag	gttctgaaat	taaggcaata	attaagagcc	taccaacca
16081	aaaaagtcca	ggaccagaca	gattcacagc	tgaattctac	cagaggtaca	aagaggagtt
16141	ggttaacattc	cttctgaaac	tattccaatc	aatagaaaaa	gagggaatcc	tccctaactc
16201	atttgatgag	gccagcatca	tcctgatacc	aatgcctggc	ggagacacaa	caaaaaaag
16261	agaatttttag	accaacatcc	atgatgaaca	tcgatgcaaa	aatccttaat	aaaatactgg
16321	caaaccfaat	ccagcagcac	atcaaaaagc	ttgtccacc	taatcaagt	ggcttcatcc
16381	ctgggatgca	aggctgcttc	aacatatgca	aatcaataaa	cgtaatccat	catataaaca
16441	gaaccaaaga	caaaaaccac	atgattatct	caatagatgc	agaaaaggcc	tttgacaaaa
16501	ttcaacagga	cttcatgcta	aaaactctca	ataaattcgg	tattgatggg	atgtatctca
16561	aaatagtaag	agctattttat	gacaaaccca	cagccaatat	catactgaat	gggcaaaaac
16621	tggaagcatt	ccctttgaac	actggcaca	gacagggatg	ccttctctca	ccgctctcat
16681	tcaacatagt	gttgaaagtt	ctggccaggg	caatcaggca	ggagaaagaa	acaaagggta
16741	ttcaattagg	aaaagaggaa	gtcaaatgt	ccctgtttgc	agatgacatg	attatatatt
16801	tagaaaaccc	catcatctca	gccccaaatc	tccttaagct	gataaacaac	ttcagcaaa
16861	tctcaagata	caaaaaccaat	gtgcaaaaat	cacaagcatt	cctatacacc	aataacagac
16921	aaacagccaa	atcatgagtg	aacaccatt	cacaattact	tcaaagagaa	taaaatacca
16981	aggaatccaa	cttacaaggg	atgtgaagga	ccttttcagg	gagaattaca	aaccactgct
17041	caacaaaata	aaagaggaca	caaagcttat	agataggaa	aatcaatatc	atgaaaatgg
17101	ccatactgcc	caaggttaatt	tatagattca	atgccatccc	catcaatcta	ccaatgactt
17161	tcttcacaga	attggaaaaa	ctacttttaa	gttcatatgg	aacaaaaaaa	gagcccgcat
17221	tgccaagaca	atcctaagca	aaaagaacaa	agctggaggc	atcatgctac	ctgacttcaa
17281	actatactac	aaggctacag	taaccaaaat	agcatggtac	tggtacaaga	acagagatat
17341	aggccaatgg	aacagaatag	agccctcaga	aataatacca	catgtctaca	accatctgat
17401	ctttgacaaa	cctgacaaaa	acaagaaatg	gggaaaggat	tccctattta	ataaatgggt
17461	ctgggaaaaa	tggttagcca	tatgtagaaa	gctgaaactg	gatcccttcc	ttacacttta
17521	tacaaaaatt	aattcaagac	ggattaaaga	cttacctgtt	agtcctaaaa	ccataaaaaa
17581	cctagaagaa	aacctaagca	ataccattca	ggacataggc	atgggcaagg	acttcatgtc
17641	tgaacaccca	aaagcaatgg	caacaagagc	caaaattgac	aaatgggatc	taattaaact
17701	aaagagcttc	tgcacagcaa	aagaaactac	catcagagtg	aacaggcaac	ctacagaatg
17761	ggagaaaaatt	tttgctatct	atccatctga	caaagggcta	atatccagaa	tctacaaaga
17821	acttaaacaa	atttacaaga	aaaaatcaaa	caaccccatc	aaaaagtggg	tgaagtatat
17881	gaacagacac	ttctcaaaag	aagacattta	tgacagcaac	agacacgtga	aaaaatgctc
17941	atcatgactg	gccatcagag	aatgcaaat	caaaaaccaca	atgagatacc	atctcacacc

18001	agttagaatg	gcaatcatta	aaaagtcagg	aaacaacagg	tgctggagag	gatgtgaaga
18061	aataaggaaca	ctttttacact	gttgggtggga	ctgtaaagta	gttcaaccat	tgtggaagac
18121	agtgtggcaa	ttcctcaaag	gtctagaact	agaaatacca	tttgacccag	ccatcccat
18181	actggatata	tatccaaagg	attataaatc	atgctgctat	aaagacacat	tcacatgtat
18241	gtttactgca	gcactattca	ggatagcaaa	gacttggaac	caacccaaat	gtccaccaat
18301	gatagactgg	attaagaaaa	tgtggcacat	acacaccatg	gaatactatg	cagccataaa
18361	aaaggatgag	ttcatcatgt	cctttgtagg	gacatggatg	aaactggaag	ccatcattct
18421	gagcaaaactg	ttgcaaggac	agaaaaacca	acaccgcatg	ttctcactca	taggtgggaa
18481	ttgaacaatg	agaacacttg	gacacaggat	gggggaacat	cacacactgg	ggcctgttgt
18541	gggggtgagg	gagtgaggag	gatagcatta	ggagatatac	ctaagttaaa	tgacgagtta
18601	atgggtgcag	cacaccaaca	tgccacatgt	atacatatgt	aacaaacctg	cacattgtgc
18661	acatgtaccc	tagaacttaa	agtgtataaa	aaaaatWaaa	aaagtagata	gtcccaaccg
18721	ctgtattctt	tttgaatcct	tttgccactg	tttcatatca	cagttttttt	ttttttctga
18781	gccctagatt	atcagtctgt	tctttttttt	tttttttttt	tttaatgtag	tccataggaa
18841	tctgctgcct	cacRgtcagt	atcgtgcccc	ttaccccaat	tctaatatga	caggtttttg
18901	tctaagacag	catttccttag	aatgtgttgt	aatgtacagc	agcttcatgt	gataattctc
18961	aaagactccc	actgtcaaat	gttagcatat	tcaaggctct	gccaggacct	gtaatacata
19021	ttctttcttt	attctgttta	acttagcatt	tctgaaacct	atcttactac	tgaactcttg
19081	acatttatta	acaaacaaat	acaaacRaaa	ataccagggt	tccaagttaa	attctttatat
19141	aaagcaaaag	gcttttaaca	tcagagtttt	ttagaatggt	tattcactca	tgcaactcaac
19201	aaacacttat	tacatagtat	gtgccagcat	aggggatata	gtaataaaca	aaacagacaa
19261	gttcctctgt	catgtaaac	ttggacttat	ggggcaaaaa	gacaataaaY	aagcagacaa
19321	aaaaaaatta	caaacactct	caatgaaggga	aaagagggtg	acatcgtaca	ttgatggggg
19381	actataaaat	taagtagtaa	ggaaaagctg	cacttgagaa	ggtggtattt	gggaagagac
19441	tcgaatgcct	agaataagcc	aaccagattt	ggggcacagc	actctcaaca	aaggctgagt
19501	aacacagcca	gtctgaggga	ggacaggctc	acggaatgag	agccgaggca	agtcaaggca
19561	acatcacgtg	ggctcctgagg	gtatgagcct	tccagagggt	gtgaggatac	cattagaagg
19621	ttctgagcag	ggaatgatag	gatgtgattt	acatttttga	aagctgtctc	tgtagaggat
19681	agttttgtaa	agtgcttgag	gcaaaactga	caagacttga	agacttgcac	aacagaactg
19741	aagaaatgag	aagaatcaac	tcctagactt	ctgggatgat	caatgtctag	gatggacatt
19801	ggtgccattt	gcaagatgga	gaagaccggg	ggagggtacg	atttaaagga	gggtatgtaa
19861	ggagaaagaa	gaatcctatg	agacaagacc	agaacatgta	aatacatgaa	gttttggtatt
19921	tcttactctt	caaagacatt	ttacctctcg	tccccgaagt	tcttcacaga	gttcaggata
19981	agaaaagctg	ccagacagtt	gagttttgaa	taagtagtaa	ctttcaaaaca	cttgaaagac
20041	attatattgag	aatagactac	atccatcaaa	ataNttaaaa	atgttttttag	aatagtccaa
20101	taattttgaa	tatgaaagcc	taagaaactt	ccttatccaa	ggccRcataa	tataaccaaa
20161	attagaattt	agtactccta	gttggcaata	tttttatgaa	attactgttt	tactaagaca
20221	ttttagaatt	gaagacttta	ctgaaggcaa	taataagtgc	aattaaaagt	ggtacaataa
20281	Kaagactttt	ttttcatttg	caacaggtta	gtagtgtatg	agaattatga	gatgtataaa
20341	agtgtagagc	ataggcttct	ctagttggct	tcagtgtagt	tcgaatcttg	gccctgcctc
20401	tcttaccagc	aatgaaatat	gcagcatttt	acttaaggat	actgggttgt	atggagagaa
20461	tcagagttaa	ggttggtgat	ccagcagtg	catgtgtcag	gagctaataa	attgtattgt
20521	gaccagaaac	actgaaactt	gttataaggga	aagcaatcta	attaaaacag	ctgcattaaa
20581	atttctacaa	tatcttccta	acagcttatg	ctatcaacag	tttgtaaaact	atcagaatca
20641	cggatactgg	ctgagaatgc	ttttggagat	ttcaaattgg	cataattttc	tcagaatgca
20701	ctgactctgac	aaatgtacag	acaggcagac	aggaatacta	ccactcttca	tgaataactg
20761	tctgcctctc	ctggatttct	tccatgttgt	gtaagtctat	tacacttttg	gtgaatgtag
20821	ctttagtaca	ttgagttaat	atcattcttg	caaagaagct	ctttataaat	tccttaaaact
20881	taatttgact	ctggacacaa	acaaatgaga	acaaaatata	gctcaaggat	taagatcctt
20941	aaccaaaatat	gtaaaaaaca	cgaaaagcct	tacaaacagt	gatcaacagt	taaacaatgag
21001	ctatcacctt	cccctaacag	ctagggaagc	atgtatatga	atggaacata	tgaacttcca
21061	tttgggtgtac	taagaaaaca	catcacgcag	atggctttta	tagcttccca	aataaggttc
21121	taataattca	caaaaagtgt	gttccctaaa	acccataata	aacaataata	aaacctaatg
21181	tttattgagg	gtctactatg	tgtcaaggag	agtccctatg	actctcctgg	aattacttca
21241	tttattttcta	ataataacct	ttaatgagca	ctgtcactcc	cgtttcacag	atgagcctta
21301	aggtccttagc	tatcaacttt	gcagacaaca	cccaagtaaa	atcctgcccc	ctcttttttt
21361	tttttttttt	aaccagaaat	ccagtccctga	caactgaaag	cttatagggc	atttccgctt
21421	agatacatag	cctttaccta	attatatgtc	taaaaactta	actgtcatat	tgtccagccc
21481	tcccccaata	cccaactggc	ttctcttcat	gattttccaa	ctataattct	gtccattatt
21541	caggttttaga	atttcatgct	ttcttctggc	tgtggtcctg	ccaagtctta	tgtatgctgt
21601	cacccttctc	tgtgcaatct	ttctcctact	cattcctctc	ttttcatcac	tatcctattt

21661	caggccctta	tcactcttac	acctaattcc	ctaacggttt	cttcttgctt	tcagtacaat
21721	ttccccttga	tataatctat	cctgcacact	accaccagat	ataaccttct	aaagtcacct
21781	tatttttagtt	tcttcataat	attttcctta	tagtcaaagt	taagggttct	tcatgaatta
21841	taggacaatg	tgcaaatggc	ttgacctggc	atttaagaca	gtctgcagta	tggcctcaat
21901	ctacatttct	cacacctgcc	actgggtcta	taatcacatc	ctctgttcca	gagaggctca
21961	ctcctccaga	atgcccacta	ccctcctctc	cagcaaacat	acaataaagc	gaatccacat
22021	gaatacccca	tcctaccctg	ccttatccag	cccctggaat	accacctctt	ccctattaga
22081	tgccatatata	aatcctcagt	attcaagatc	cagcttaagg	agcacttttt	ctggggacca
22141	tcattctcgt	cctctgtatt	gaatactcga	actcctctac	aggacaggaa	cataatgtat
22201	tattacccta	tcattcatta	acacacaaca	ggcttacatt	atatggctgg	ttgtattttc
22261	agagggtatgt	ctatatgttt	cgctatctat	ctatctatct	atctatctat	ctatctatct
22321	atctatgtgt	ttgaatacag	atacataaaa	atctcatttc	acctataaga	acctctggag
22381	cagatacatg	catatacaata	attgggctaa	aacaaaaatc	cctcagtga	aacctaaaga
22441	ctgggttggt	gttggttgca	gccaaaacgt	acaaaatgaa	aacctcctaa	cgattttatt
22501	tccacatgaa	attagtagca	gatctagaga	aaaatggaca	aggatcaaat	acaaataata
22561	aagtcacac	caaactaaaa	atttcattca	aaagtgtga	tggtggccgg	gtgtgggtgac
22621	tcacacctgt	aatcccagca	cttggaagg	ctgagggtgg	cagatcactt	gaggccaggga
22681	gtttgagacc	agcctggcca	acatgggtga	accccatctc	tactaaaaac	acaaaaaaca
22741	gctgggctgt	gtcatgcacc	tggtataccc	actactcagg	aggctgaggc	aggagaatca
22801	cttgaatcca	ggaggtggag	gtggcagtga	gccgagattg	tgctactgca	ctccagcttg
22861	ggcaacagag	caagactccg	tctcagaaaa	ttaaaaaaaa	aaaagtgtat	atgtcagtaa
22921	agacccaaat	cagggtcata	tgtttaacac	cagaaagttt	gtatttgcta	caagacagaa
22981	accttgacaa	aataactttt	ctgtgctttg	ttacttcatc	tgaatgaaga	aggtaaacca
23041	gttgatctca	caaactctct	tctaagggtc	tctggaattt	tttttttttt	ttaacaataa
23101	aaaggaaaaga	gacttcYctt	aagcagaaac	aagtccgact	cctctgtaaa	gtggctgaca
23161	gcaagtggaa	aatggaagaa	gaacaattac	ctgcaaaatg	actcattccc	ttgtaacaac
23221	tacactacta	gggaattcct	tctcttaccg	gctgtggcta	gcgtcagact	catgacaaag
23281	acctcatcct	ggggctagaa	ctagggttag	ggttttctca	ttcattcctc	tgtttctcag
23341	ctgcattttc	attttttaac	tggtcaatga	ttacagaggc	ctatgttttg	ttttcatttc
23401	tagtttcccc	aggaagagac	aactactatc	ttgatattga	ttaacacttg	aaacttctgt
23461	taatacacaat	ttcagtattt	cagggaatca	gagaaatcat	ttggaagagc	cttgaaggtc
23521	atccagggtg	agagaaaagc	aaagcacaa	caacagacca	atgtttagac	acagtgaagt
23581	gaagRcctac	aggagaccct	ctcaacttca	ataagagtct	tttttatggc	tgtcttcata
23641	ttctttcaaa	gaaatcataa	taaaggagtt	agtgtagagt	ttaaataaaa	ataggctatc
23701	atagagtgtc	gggttaactga	gctaaaacta	aagtaaacaa	actcagtggg	ccatcacata
23761	tgcaagtgtc	taaggtctca	taaatcacca	tgactgggta	ttgggatttc	aaaggcacac
23821	tctgtaagct	ttctcccagc	cctgttgatt	caagctccaa	ttgcaactgg	ttacttatat
23881	ggcagcatat	aaagttgacc	ttttaYgttt	aaaaatagtt	ccattcctca	tccctcctaa
23941	ggataggcca	cagtacatct	catatgtccc	caccacacta	cataatttat	gtaagttttc
24001	acttaatttt	caacacaatc	ctttgaggta	gattatgtta	gtcctSattt	acagggaata
24061	cagaggctca	gggaggccaa	atttattttat	ttatccaagg	ttgcaactct	actgtagggc
24121	agattttatat	ccagaagagg	aattgcaaa	ctcctcagaa	tttaggagat	ttaaaatgga
24181	atcaagataa	aggttcacat	ttttcatctt	ctattccatt	ttactcttcc	agcatctaat
24241	aataacctat	gatataattag	aacaaatcag	cccatactta	ttttgacagt	ctcttttcac
24301	cccattttcag	tttgtacctt	gctgtctcag	agcccatcaa	ccacctttcc	tactcccag
24361	gcagccgggtc	cttcaggggg	tggtctggca	gttgggccac	catcctctgc	taccagggca
24421	tgactcatgg	aggcaacagg	tgaagctgaY	gccaactatt	agtgtcaaaa	aagactcaag
24481	cctcatgaaa	tataccatcc	ataaatcgct	ctccagtcag	ctctaccctt	ccctccattt
24541	ctacagctga	ctgtctgttc	ttccttaaac	atttacatcc	gccactgacc	tgtctgggat
24601	ttcttttttta	cttcaaggYt	ctcctaaaag	ttcagtMcaa	ccaggtttca	ccaaatgaac
24661	cctgcgggtg	aaaggggcag	caacgggcat	tggtcagttt	gcctccagcc	aaggaaagtc
24721	tgactccccct	ccttctccca	ctcttctctt	tctctgcctc	acactgccta	atagctcttt
24781	cctctttctc	tctttctttc	cttatatctt	cattttccac	cctattcaga	agtgaacctt
24841	cccttgccac	tttgccccc	ctaagaaaac	agacctccaa	cacaacctct	taaYaggcta
24901	attttaaaat	catgaacctg	cttacacctt	ccgtgagttt	atcctatatc	ttctctatct
24961	gctgtctgct	tcccactaag	gttttatccc	tccatccccc	ctccaaatcc	tttacagctc
25021	agattctcaS	atctgcttta	gtcacttggt	ctcctcatcc	cactgacctt	attatctctc
25081	tggtcacatg	ttagagggca	catgctcctc	ctagggaacta	gggcccaggtc	agttatgtct
25141	ccatcctgac	atgacctaga	gaacaaaaaa	ggcaaaacga	ggtagctgtg	gattcctctc
25201	taggaattat	actttgctga	aattgtctct	gctatttttg	aatctagtgc	tcactaaata
25261	catttttaaa	atattatttg	gatataattt	gaaaaatacaa	ccagagggtcg	ggcacagtgc

25321	cttacgcctg	taatcccaac	actttggcgg	gccaaaggtg	gcagattacg	aggctcaggag
25381	ttcgagacca	gcctggccaa	catagtgaag	ccctgtctct	actaaaaata	caaaaaatta
25441	gccaggcctg	gtggcaggcg	cctgtaatcc	cagctgcttg	ggaagctgag	gcaggagaaat
25501	tgcttgaacc	tgggaggaga	aggttgcagt	gagcctagat	cacgccattg	caactccagtc
25561	caggcaacag	tgcaagactc	taactcaagg	aaaaaaaaaa	aagagagaga	gagagaaaat
25621	acaaccagag	aataaacact	tgcttcttca	tctctccatc	ttccccacca	atacaacatc
25681	cagaaaaatg	tcatctttac	acttatttag	aagcacatag	atcttataaa	aStttaactg
25741	agcattaggt	tttcatcttt	aaaaatattc	tgaggctggg	tgactggctt	catgcacttt
25801	gggaggccaa	ggcaggagga	tcacttgagc	ccaggagtgt	gagaccagcc	tgggtaacat
25861	agtggagacc	tgctcttaca	aaaaaaaaaa	aaaaaagtta	aattaaatta	aaaaacagaa
25921	aagccggctt	ggtggcacat	gcctgtggct	ccatccactc	aggaggctga	ggtgggagga
25981	tggttgagc	caggggagatc	aaggctgcag	taagccatga	tgccgcccact	gcactccagc
26041	ctgggttgaca	aggtagaagc	ttgtctccaa	aaacaaaaaa	aaacaaaaaa	cgttttgaca
26101	tgtagaatac	tggttctggg	actaaattag	agattttaagg	tttgagggtat	gagaaaaatc
26161	ctggaatcat	gccttacatt	agaaggttaag	gtaaatatctg	gtgtttccca	atgagtgtga
26221	gtcagattgt	tcatatgtat	caaacagaca	atatactgaa	atattttaaaa	ataaggctaa
26281	atagcaacaa	ataatttttc	ccatgaattc	tacttttttt	tttttttttt	ttgagatgga
26341	gtctcactca	gtcgcccaga	ctggagtga	gtggcgccat	ctccattcac	tgcaacctct
26401	acctcctggg	ttcaagtgat	tctcctgctc	agcctcccga	gtagctgaga	taacagacat
26461	gcaccaccac	acctggctaa	tttttgtatt	tttagtacag	gccagggttt	gccatgttgg
26521	ccaggctggc	ctcaaaacttc	tgccctcatg	tgatcgacct	cccaaagtgc	tggtattaca
26581	ggtgtgagcc	accatgccca	gctgaattct	actttttttt	tttttttttt	gagacagagt
26641	cttgctctgt	caccagggtt	ggagtgcagt	ggcacgatct	tggtcactg	caacctctgc
26701	ctcctgggtt	caagtgtatt	ctctgctcag	cctcccaggt	agctgagatt	acagacatgc
26761	accatcacac	ctggctaatt	tttgtatttt	taggagagac	gggatttcac	catgttggcc
26821	agctagtctc	taactcctga	ccgcgtgatc	tgctctcctc	tgctcccaa	agtgtctggg
26881	ttacaggctt	gaggcaccac	gcccggctgc	tgaaattcta	cttttgaaag	aacaaattcc
26941	ccttctgtag	ggactgatga	ttcagctctg	aatgatgcat	tctcttcac	ttcttttttt
27001	gtcttttctt	ctatatatcc	tttaggcatt	ctactgtatt	aacactagat	agaaaaatta
27061	agattttagg	ccaaacatta	tcttctggca	taaagtaaac	taatcKtttc	ctgatgtaca
27121	ataaataaac	agacataatt	ctagtagaag	attccttatg	atttatcaaa	acccaattat
27181	cacttaccct	tatggagatc	ttagatctta	gaaaccatc	tgacaatata	agattaaaga
27241	aacaacagaa	aatcaaaaata	tataccaagg	ataatgttaa	taggtttcat	ccttatcaca
27301	gcatactgtt	gaaacttact	tgaaatattt	ttttaaaaaa	gatacaagag	gacaagtgtt
27361	tagtttttaa	caagggaggg	gactagtcaa	caaaYattga	ttacctaatt	tatgaacagc
27421	tctggccaaa	gtggtcaaaa	aaaaaaaatt	aggactttag	ttttcctaaa	cctattctta
27481	tttttaacag	gattatagct	ttgttcaatc	tttacagtct	ttagcctctt	ttgtgaaatg
27541	ggtttctctg	taaaataata	aatgacacct	atatataatt	aaagcactca	tgaaataatt
27601	ttatctcttt	attaaaaact	gtgataaccc	ttccaatttt	gaaatttatt	gtcttctcaa
27661	attcttgcta	caaagcctat	cattaatatt	gcagttcatt	ttttccctaa	agattgaaaa
27721	aaacactaac	aaatataaag	tctttatggt	caaagaatgt	actcctttta	taaaacttgg
27781	agttgatgta	aaggcacaga	caacacaagt	taccttaata	ataaatgcac	ttttctttgt
27841	aattttgggt	aattcagtg	gatttgtaat	tcttttaaaa	gacacacaat	cactgttatt
27901	tttgcatggt	tctttttttc	ctaatttccc	actatagtga	aatatctgtt	tttcttcttc
27961	tattgggttt	ggattggaat	gatcaggtag	aattaaatgt	aaaaatacaa	aaggaaaata
28021	ctttatagat	cttctcaaaa	tactttgaag	ggtataatct	ctttaagatg	gctttattca
28081	tattttaagc	aaaaacaaaa	agcaaccaaa	acactactgt	ttatacaaaa	agcagcttca
28141	aaatcagcca	gttattttct	gaaatggaga	tgccagacat	tagcctgcac	ttactccaat
28201	atggcagccg	catctttggc	tctttgctat	ggacacatcc	ccaggaggcc	tgtactttct
28261	actctccaga	cctgtttatg	acaggccaag	gtgtttccta	ttatgggtgc	tatggctgca
28321	cagtgcactg	cttgtcagta	ataaaagcca	gaggctgtcc	ctatagggat	tacagtgcag
28381	cagaccagag	atgctgatgg	gaatgcaagc	atgccctagg	caaacattgc	agaatactct
28441	ctgacaggca	aaagccaaca	aacacatcct	ttcttcccag	actagcaggg	aaagtattca
28501	gttatgtcat	tttcaacttg	aaacaaactaa	taagaagaat	gttattgcta	aaataggtag
28561	agatgagaaa	gagcagttta	tgaccatgaa	tatggcctct	atggtttttg	cctgtgcact
28621	acaaactttt	aatttaaacy	agatgagatt	gatctagcat	atactatgat	aaaatttctg
28681	agacatgagt	atctaaaagc	agaactgaga	ttaagtgaga	aatgtctcag	attcctgtca
28741	ctgaaagaaa	aagaaaaaaa	cctttcttga	aaggcacaaa	gtagaatgct	cagactctcc
28801	atctaccaat	acaaggtaaa	aaacagcatt	tgcatthaacc	aacatcatgc	attctgttac
28861	taatttatgt	gactaaactac	aaaatgttat	attgacactc	actgtgtagg	gtgtcaggat
28921	ggccaagtgg	tctaaggcac	cagacactca	ctgggttggg	ctaaaaaac	Ygtagaagac

P A T E N T
Docket SEQ-4095-PV

28981	ctcatcagaa	caataaaaca	gagacacaaa	atattgtact	aagagttaag	agaattacaa
29041	ataaaagttc	tgtggaaagt	caaaggtatc	caattaggaa	agcctgaggt	gggagacata
29101	ggacacccca	gatataggat	gggaagaaga	tgggattaaa	aaaaaaggct	ttataaagga
29161	tgtaacattc	cagataggcc	ttaaaagatg	gcttcgatct	tttaataaaa	actttttgtt
29221	ttagaacaga	tctagattta	cagaaaactt	gtgtagacat	tacagataat	tcctatatac
29281	tctacactgt	ttcccatttt	taatgtctga	cttttagtatg	gcacatttgt	cacaattatt
29341	gaaccaatac	tgatacatta	ttattaaaca	aagtccacac	ttcattcaga	tttccttagt
29401	tttcacgtaa	tttccttttt	tctgttctgg	atccccatcca	ggataccaca	taatattttag
29461	tcctcatgtc	tcctgaggct	cttcttggtc	gtaggatatct	caggttttcc	ttgtttttga
29521	taaccttgac	agttttgagg	agtactggct	aaatactggt	caagtttcga	gggtagaata
29581	tcctcaact	gagatctgtc	tgggtatttg	ctcatgatta	caactggggt	atatgttttc
29641	agtagggaaa	ccacagatta	aaagtgccat	tttcatcaga	tcataatcgag	ggtacatggt
29701	atcacttatc	actgtcaatg	ttgaccttga	taacctggct	gaagtagtga	taggWttctc
29761	cactacagtt	tctttttttt	ccctttctac	actgtactgt	ttagaaggaa	gtcaatatgc
29821	acagctcaca	cttacgggtgt	agggggttat	gttctccctc	cttgagagta	gagtatctat
29881	agaagttatt	gggaattccg	cacaggagga	gatttgtcta	ttttccccc	cttaggtatt
29941	tatttaataa	attgtatcaa	tatgggttta	tggatattta	ttttaccctt	tgggatataa
30001	tccaatacta	tattattttc	ttgtctcaaat	tgttctagct	ttggccattg	ggagctcttt
30061	cagtttgctc	ttgcaactct	tcagtatat	cccacgggtg	taggggtcca	ttgttttgag
30121	caggctccta	ctttttggca	ctacaagatg	ctccaggctc	atcttacata	tttccttctc
30181	gagtccttag	aaatcagcta	ttttttttca	aagagtcttg	gttcctttta	ccagagaatg
30241	gtattagaaa	ccaaaatgag	gggtgctaagt	gtgctcatg	ctactggggt	atggtagctt
30301	ctagaccctc	tcggctgata	gagcaaggaa	atattttgtg	gtataactaga	tggtaagatg
30361	ttgagaggtg	gaatggagag	ttaccttctt	aataatactt	tcttaataat	aaatatat
30421	aagatattgt	gtgcctgggt	tactttcagt	cttatgcaga	ggaagaacgt	atgtacattc
30481	atttatgaaa	aacactggct	agactattct	tctgcactgc	attatgcatt	tctgctagaa
30541	aaagctcaga	gattttcaga	tattctgaca	aaaatctcag	gcttgcttga	tgagctatac
30601	tgtaaaaatta	cagaaggaaa	caaagggcaa	actccttgaa	ggatgaaaat	aaaggataaa
30661	aacatataaa	acaccaccaa	aaaaagtgat	taatggggga	gaagagtaaa	taaaacatta
30721	taatagtcct	ctttgggttag	tatcaatatt	attaggtcac	tttatcaaaa	ggatagaaaat
30781	caggatggca	gacacccttc	tctaaccctc	accccccaaa	ataataaaat	aaaaactaat
30841	gttattcctt	cacatatgga	aatgaattgag	ttctactgag	tatctagtat	gattcctgac
30901	tcagtcgaga	caattcccat	cttttaattc	attaaatcac	cacagcaact	atttaacaga
30961	tgagaaaaact	gaagcacaga	aggcaacRtg	gcccatttta	cgtttggtaa	aaggcagaga
31021	atgaatccaa	ttcaggcagg	ctgtctatag	taggggtgct	taaatccacg	gaccattctg
31081	cctaaggaat	gaatatttta	tgaattggaa	tatttctgct	gaacgaattt	gccattttct
31141	cctctagtgg	agaaatccaa	ctgagggtaa	agaaggaaaa	atgttgattg	tttaaaacaa
31201	taaatttagt	tctaatttgt	tcttgacagt	gatttagact	agtgtgtcca	aaagtatgcc
31261	cagtggttagt	aaatggtagg	caaaatgctt	taagggtggt	caagatgaat	gttttctcat
31321	tttgttattc	attaatttta	gaaaaaatac	agaaaaaata	taacttgaac	atcaaaccta
31381	tgatttcatg	tataccatta	cttaagatga	ggcacttggg	tgagtattta	gatttaacaa
31441	taagttgctc	ttagcatttc	tatactttga	caataaatta	tccaaaaaag	aaattaagaa
31501	aataatccca	tttgcaatag	catcaaaaaa	atacttagga	gcagccaggc	gtgggtgctc
31561	actcctgtaa	tcccagcact	ttgggaggcc	gaggcgggca	gatcatgagg	tcaggagatc
31621	gagaccatcc	tggtctaacac	agtgaacc	catctctact	taaaaaatac	aaaaaaaaaa
31681	aaggcaggtg	tgggtggcagg	ggcctgtagt	cccagcta	tgaggaggctg	aggcaggaga
31741	acggcgtgaa	cctgggagggt	ggagcttgca	gtaagccgag	atcgcgccac	tgactctag
31801	cctgggcaac	agagcgagac	tccatMc	aaaaaaaaaa	aaNaaaaaac	ttaggagcaa
31861	atctaacc	caaggtgaaa	gatctataca	ctggaaacta	caagacattg	atttaaacaa
31921	ctgaagaaga	cagaaataaa	tgaaaagata	tcccatgttc	atgcactgaa	agaattagta
31981	atgttaaaat	gtccacacta	tccaaagcca	tctatagatt	caatgcagtt	cctctattga
32041	ttcaatgcaa	ttcctttcaa	aattccaatg	tctttttttt	tcacagaaat	agagaaaaaa
32101	atcttaaaat	ttatatgaac	caaaaaaaga	cctaatagcc	aaagcaatct	tgaacaaaaa
32161	gaacaaagct	gcaggcatca	tattccctca	tttcaaaata	tattataaag	ctactgtaat
32221	caaaacagca	tgttattgac	ataaaaaaca	acatcaacca	atggaacagg	atagaaagcc
32281	cagaagtaaa	tccaagtatt	tacagtc	tgatttttga	caaaggggtcc	aagaacacac
32341	aatggagaga	ggacagctc	ttcaaatagt	gttgggaaaa	ctggatgtcc	acctgcagaa
32401	gaaagaaact	gtactcttat	ctcacactcc	atataaaaa	caactcaaaa	gagatataaa
32461	ggcttaacaa	taagacctga	aactgtaaa	ctactagaag	aaaaataaag	ggaaaatctc
32521	cacaacaatg	gtctgggcaa	tgatttcttg	gataggactc	caaaagcaca	ggcaactaaa
32581	acaaaaatag	acaaaatagga	ctacattaaa	ctaaaaagta	cctgcacaag	caaccaataa

32641	atagagtga	aagacaaccc	atggatcagg	agaaaatata	tgcaaacat	acatctgata
32701	agaggcta	attcaaaata	tataaaaaat	tcaaacaccc	aaatagtaag	aaaacaaatc
32761	gattaaaatt	agRcaaagga	tctgaaYaga	cacactttcc	tcaaaaaaga	aatatgaatg
32821	gccaacagag	atacaaaaaa	aaaaaaaaaa	aaaaaaaaaca	atgttcccca	gccctgcaca
32881	gtggctcatg	cctgtaatcc	cagtgccttg	ggaggctgag	gcaggagatc	acttgaggcc
32941	aggaattcta	gacaagcctg	ggcaaaatag	caagaccctc	tctatacgaa	aaaataaaaa
33001	gccagggtatg	gtggcacaca	cctgtagtcc	tggtactctg	ggaggctgag	gcaggatcat
33061	tgagcccag	aatttgaggt	tacagtga	catgatcaYg	ccactgcact	ccagcctgaa
33121	caaaagagca	agaccctgtc	tcaaaaacaa	acgaaaactc	aacaatatct	ctaattctca
33181	gggaaatgca	attaaaaacca	caatgagcta	tcacctcatg	cctgttagaa	tgactatttt
33241	cctttttttt	ctcttcaact	tttaagtcca	gggttacatg	tgaggatgtg	gcaggatgtg
33301	caggtttgtt	acataggtaa	acatgtgcca	tggttgcttc	acgtatcatc	ccatcaccta
33361	ggcactaagc	ccagcatcca	ctagccattc	ttcctgatgc	tctccctgca	cccattccac
33421	ccgccaacag	accccagtat	gtgttgctct	ccaccatgta	caatggctat	gttcaaacag
33481	atgaatgata	acaagtgttg	gcaaggatgt	ggagaaaagg	gagcccttct	acactgttgg
33541	tggaatgta	aattagaacc	accattattg	aaaatagtat	gaaggttcct	caaaaatcta
33601	aaaatagAAC	taccataaaa	tccaaacaatc	ctacttctag	gtatacaccc	aaaggaactg
33661	aaattggtac	atcaaaaaga	tatttgcact	cccattattca	tttcagcttt	atttacaaca
33721	gccaaagatat	ggaagcaatc	taagtgtcca	tcaagtgtgc	ataaagaaaa	tgtgatata
33781	atatatatat	atatatatat	atatatatat	tatatata	tatatata	ttatacaggc
33841	cgggcgcagt	ggctcagatc	tgtaatccca	gcactttggg	aggccgaggc	gggcccagca
33901	caaggctcagg	agatcgagac	catcctggct	aacatagtaa	aaccccatct	ctacttaaaa
33961	atacaaaaaa	ttagtggggc	gtggtagcgg	gcgcctgtag	tcccagctac	tcaggaggct
34021	gaggcaggag	aatggcatga	acctgggagg	cggagcttgc	agtgaagcga	gatcacacca
34081	ctgcactcca	gcctgggcta	caaagcgaga	ctccacctca	aaaaaaaaaa	aaaaaaaaaa
34141	aaaaaaagat	tacacagcct	tataaaagaa	agaaattctg	tcattcacaa	catcatggaa
34201	tggaactaca	ggacattatg	ctaagtga	taagtccaggc	acagaaagac	aaatattgtc
34261	tttaataaat	gatctcactt	tatggggaat	ctagaaaagt	cgatctcaga	aacagagagt
34321	agaaagggtg	gttaccagag	gctgtagagg	aggagggaga	gagaaatgga	agatgtcgat
34381	caaacagtag	aaaatttcag	ttagattgga	ggaataagtt	ttagtgatct	attgcactgc
34441	atggagaccc	cagtaattaa	taacgtatta	tatgttttac	aatttctaaa	atagattttt
34501	gacattctca	tcacaaaaag	ataaattggt	gaggtaatat	agatatgtta	attagcttta
34561	ctaaatcttt	ctatgatgta	cacattttta	aaatcacatt	atacccaaga	aatagatata
34621	attaatattt	gtcaattaa	aataattgac	aaataaattt	taaagattaa	taaaaaatat
34681	attaagttaa	aacattcaac	atataatagc	agatatgaat	gtacacagaa	atgacaaaat
34741	cccagcactg	tgaggaggccg	aggaggagg	atcacgaggt	caagagatcg	agaccatcct
34801	ggccaacatg	gtgaaacccc	atctctactc	aaaatacaaa	aattagctgg	gcatggtggc
34861	atgcgcctgt	agtccagcta	ctcgggaggc	tgaggcagga	gaattgcttg	aacttgggag
34921	gcggaggttg	cagtgcgtgc	agatcgatc	actgtactcc	agcctggcga	cagagcgaga
34981	ctctgtctca	aaaatgacaa	agtttgagca	acattaattt	ggactgtaaa	ttcttaagaa
35041	atagaaaagt	catgtttttc	ttctaagaaa	tattatgttt	ttacattgca	agaaatatgt
35101	gacacagagt	ttttcttaat	ctctcttttt	tagtatattc	tagacaggca	agcacatgca
35161	atttattgag	cacccagtg	gtgctaagtc	accaaagcga	gctttacata	cattatagct
35221	aatggtctca	ataacttttt	cattttattt	tcccctttca	ttatcgccac	ttataaatga
35281	aaaaactgag	ctccagagcg	gtaaggccta	ttgcccacaa	tattagatag	gaaacaacag
35341	agctggaatt	tgaaaccaag	tttgcttaat	gaaaaacatt	tatgttcttt	tcactgtata
35401	aagctgctgt	aagtatcact	ggtgcctact	ccaggccagg	gagtataat	cattcatcct
35461	tatcacatac	aaagtataac	aaaacaaaaa	caagaagctc	tgaatactaa	ataataataa
35521	taaatacttt	ataaaagata	aactattctc	taagagtaaa	agataataaa	cctattgtca
35581	ttgtagttgg	tcactgaact	taactaattt	cctaattggac	gcagcagaat	tgtttgttgt
35641	ttaagcaaat	atcaaggcat	accccccaat	ccctgttaca	gggaataaaa	aaagtcttct
35701	tcaaatgcct	ttcaaaacta	atgtgaatat	taaaataaag	tgctactgat	ctctctacat
35761	tctagaaaga	tctcagacta	acagtgctca	ttaaactatt	acaacaaata	gccatgtaaa
35821	aactgtctcc	ctactagagc	tacgctatca	caaaattaac	ccagcaatc	tacagtctta
35881	gaaaaagagt	tggtccctcc	tgctgaaaaa	gagaaaacca	aaccctacat	attttgtgaa
35941	tccactgaaa	ataatgacat	aaacagcact	gcacatccat	catgtattta	tatcttaagt
36001	gatagctaca	gtctatgtaa	ctatcgaga	aatcttctta	aactgaacaa	aagcattatc
36061	tatcatcctt	tctctctaga	aaaataccag	tttgtttaat	ctaccataaa	cattagaaaa
36121	aatacttctt	ttatcatggg	caatccttat	gtttcggaat	tttttctgaa	aacgtagaca
36181	gttcataatg	ctctcagaca	gaagttaaca	ctactacccc	aaatattaag	tcaaatgta
36241	actgaaaaaa	agaaatttat	ctagtaatga	ttaatttatt	gaataattaa	aaattaggag

```

36301 tttttgataa ttaaatgttg ggaataatta aacttttact aaatactggc acaggaactg
36361 aacggatgac aacagagaca agttaagatt tgttttaatc ctaagtttta tgctaaggta
36421 acatcaaggg ctctactttt cagtgaagaa aaaatttcct ttaaaattgt ttccctcttc
36481 cattattact taaaagcaaa gaaagtattt tttctaacag tgattatagg attctcaatc
36541 tttcatatta actttaaggt actacatgta agctacataa atctttccca aatctacctt
36601 tattgagtag atgaaaaagc agatatcgaa ctcaaaacat ctaaatgttg attttctata
36661 attatagaag atattttctt ttgaaattta aagtttgtat ttaggcataat taacactttt
36721 ttaatctaag atttaatatg ttaatgtaga aaacaactga ggctgttttc tctctataaa
36781 actaacatgac cttttccaat taacttagtt cccttcttag caaaagttta acatttatat
36841 ctgttgaggt acaYtgtagt tgcataatgt ggaaatatct taagatttag ccacttctat
36901 gaagatccta tatttggttat aacacccctc ttgccagaa gaaaatacat caacaaaag
36961 tctactata tgttctgcat tgactattac aaagcagtag ggggagcagc cagagaaagc
37021 tctgagacaa agcaccagc aaagcaattt aatttatagg caacagaaac atgctagaga
37081 gggttgccaa aagccaaata cacaaaataa attccataaa gaagtcatga ccacatttgt
37141 aaagctggcc taagtattat tgggaatgaag tatagaaaaa tctgaagtct cttagaaagg
37201 gtcctgattc taactcaag acagactttc agcttgaaac acagtcattt ccagccatgc
37261 caaacctcaa actgccccca aaatttagagc agaaacaaaa tacattttta tagtgatatg
37321 tcttggaat aactcaaaat gatttcgttt tctcctttga acctactga acttacaggg
37381 aaggcctggt gaaatgtgca ttatttaggtc acaagaggat aacgttacag gggtccatag
37441 cataatcctt gaaagccctg aggccaggc cgtgtctctg ctctcctctc tactgactcc
37501 catcctcaat atactttcca tgagagaaag gtaacaaaaa acatggtgaa actattctgc
37561 ttaaaaggtg ttttactgaa aaggcacatt gaccactaac ccttattaca tttcacatgt
37621 tctaaaaatt agtaaggtct gcattttcag ttttagagta aaacaggaaa agtacttagt
37681 tagctcttct gtctggcatt ctgtaactgg aatttaagaa aagcctaaac ttctaattag
37741 aacttcagaa tgttcatgtc tgtattatac cacaaaaact gtaaatataa ttttaagcatt
37801 tttatgatac agaaatgtgc gctatagaca gttatctaag aattataaaa atccatcaaa
37861 ctggaagtgt ctggtataaa ttacaaccga atggtaaaaa gacatttttag ccacgtaggc
37921 aaccaatgaa gtttgacctt aaaccctaat aatagcaata acaacagata cagtgcctac
37981 tattgtcaga tactatatta gctagctctt ttgtatatat tctttKgaac tcttactctg
38041 acttttcaag atagtattta tgggtgccat tgtatgctaa ggaaactgaa gctaaaaaaa
38101 attgaagtca tttctctaag gtaactccat tagcaagaaa caaaaccata attcaacttc
38161 cagggtttgc tgcctccaaa gcttttagagc ctactataaa ttaccctcaa ttgtagcaat
38221 gaggttccaa aggaaatctg tacaaatctc aggcagatta atgtgcttat aagggtaaat
38281 gccatagatt taactactca aattaaatgc catctggaat ctcttaccct acttggtaca
38341 agcactcctac atgtgttaca gccaaccta gccttgcca agaattcaat aattttYctg
38401 ctccaatgcc atcaacaagc aagaaacata tataatacca atacaggaaa tacagctagt
38461 tgctcctaga gcatcattta aaagctgcta attggctaag atgcctttta ttgagaagtc
38521 taagaaacag aaataatgtg ttaaccagat ttgttaaatg gggttgagga atcagtttcc
38581 tctctcctaa tacctaaatc catctccata ataagtattc tctatcacca tttaaaaatc
38641 ctgatctctt actagtgttt ttattgtgct tttcaatctR ttagagtaaa ttttttaaaa
38701 cctcaagaga gaacacagaa aactgtcata atttttcaaa ggctaaggga gaataaactg
38761 aaaatatcag tttgaacacg tgtatgtaaa aagaatggat ggtaataaaa ctaacaactg
38821 aaaagcaatg tttctgactc attcattcat actcaagaaa tatcaaataa ctgagtggag
38881 atgatgcaag ctgtacacat ttccagttca gactgaaggt gtggcaacac tcacaggggc
38941 cttccgatca gctgtcccaa ctccagtttac agcttttgtg gatgtggctt attcatgcc
39001 ttgttatgaa gaagaagggt aactttacaa ccttttagcaa gagctttttt ttctttctgt
39061 gctaaccctt ttttgtctat aacagtcatg taagcttagc actgatttag aaataaataa
39121 gttaaagaag acacgaatgg cttggacatt aaaagttaa gcaacagctt aagctgagct
39181 aagtttaatg ttaaaaatta gtgtgacagc aataattttt caattcagct ctgtcgtggg
39241 ctaggaaaaa atatcctaatt ttttcagcca caagacataa acattgctag aatgactaca
39301 ttttgaaaaa attatcttct cactttacct agatttcatt ttaaccaaac agaccaacct
39361 ctctatttaa acctgtaaat taactcaaag tctaactctg ggccttcata ataaagattt
39421 tttttttaaa tccctgtctt atctggtgcc tttaaaagaa aggaatcatt ttaggcaatt
39481 attatgtacat aaaaaatttt taaatcttaa cgtatagatt aattccttga cagctgaagt
39541 catttacaat acattattaa atttcacatt cagtttttaa tccaaacata gatctcaaca
39601 ttaagaatat ggatttttagg gaaagYaact agctgctcaa attcatttag ctgaaaaact
39661 actgtcgaat caccttgaaa aYatacacta atgcttgac attgctaagK ggcctttgat
39721 tctgtctctc attttcttac acagMatcaa ccacacaata gaattaaaga ctcaggcca
39781 tggcaagtg ctccatttta gcagtttaga cactggacat attcagcata tgtctactgc
39841 tattgagaat caaattatga aaacaaacta tattttataa aactaagaat ttgttactca
39901 Ratgagaata aaggtgccta atgcYacagc agggggtaaa agtcccagta agagagcaat

```

39961	aattggtcat	tctgatgagg	agctgtgcca	aatttagaaa	tgaggcacia	atgacaaaaa
40021	aattgatcat	cagtgtggac	atgggttaggt	cagtgtgcat	atgggttaggt	tagtatctgc
40081	tggcgtgtc	tacagagccc	cttttattta	tttgaagcca	acttttctact	tgacaatgct
40141	acctacaaaa	gcactgttaa	tagataagac	aatcaagtgg	ctgttatgcc	gtggcctttt
40201	tgtaaaaact	gcatgagaac	aggtgggata	aaaaccatag	aaaggtagaa	aaaaaaaaagc
40261	atcactcatt	taaagatatg	tgacacataga	tgaactgtaa	gataatataa	ccttcttgac
40321	cttgtaaata	ggtggccaaa	aatacttaaa	tatctKgacg	aggcaactat	tactaattgt
40381	ctcacaacat	taYcagtcct	tactggctga	atccttcagc	catctgcata	cgacatgcac
40441	aggcaaatag	ccactaaaaa	catacacaat	tccaattatc	tccttgcata	actaaagaca
40501	aaaagaacag	gaaatccaaa	aaatacagca	aaactgaaaa	cactatacct	tgccctccgt
40561	gctattttta	ggctgtccca	ggctgaaggt	tacttctcag	ccctcaaaac	tccattaact
40621	gccaagacca	gcaccttagc	acatatggca	cagatgccta	gttgaaagcct	ccttgtagta
40681	aatgacctca	aaaaactggg	ctttctttcc	aagattaatg	gaaacaaaaag	taatgtcat
40741	aaggaacctt	ctaactctgt	taatgtttcc	tgcgatatg	tatggccaac	tgaatatata
40801	aaggctcagt	tcttgcgggg	taccctgaca	actagatgaa	ttagggtgaa	ggttccaaagt
40861	tcgatgaact	cttctgagtt	tgagtgcctt	aggtgggtgac	attcaagtga	tttcacagac
40921	atccaccaat	tcttattttc	aaccgggaat	cccaagaaca	cctttaaaca	tgcaatgcc
40981	atggacccta	ctgggtttct	gctgcaaggg	ctcagtgtta	cttaggaacc	ctgtgtcttg
41041	ggagataact	aaatttagca	cgtaaaattg	cttttggaag	atgtttatct	ggcgtgacta
41101	ggggaggcaa	agcaaggaaa	caggaaacct	cctctaagga	gcagaatagc	caacatgcag
41161	taagcctaaa	aaacctctca	atttattttcc	cggggctatg	ggtaccagtg	gctcgccggc
41221	atgggaatcR	gcagcctggg	ggcaccagtg	acagcagaac	cggggcttac	cttgttgagg
41281	gccatctcac	tgacggagtg	cctgggtctgt	agggctctcta	gctggtccag	acaccagtcc
41341	agctctccca	gggtctcgct	ggccagtttc	tggtaggcct	cctctgcgaa	gagacaggga
41401	aagggggact	cagttctcaa	gcgcttcacg	ggtccgctag	cgagtccaaa	ggggccatc
41461	ctgccataacc	ccgccatgct	cggatgccc	gtgcccgcac	atgagggtcg	ctccttcata
41521	ttgccagacc	cggcagtgca	acgggggccc	aggtgtgtgt	cgcgggggcg	ccggcctcgg
41581	ggaggcacgg	tctctccagc	ttggcgtctc	gggtcgccct	ccaggagggg	cgtagcaaga
41641	gcggcgagcc	aactttcaca	cagcgacgcg	agcggaaaaa	ccactatgcg	acttttcaac
41701	tgtagcgccg	gcccagagtc	cagtccagga	gcYcggtct	agcggtatgg	gaggggtgg
41761	cgagcgcgct	tggtgccccg	ccccgcagag	gagcgtctgg	tccacagccg	gatctctcgc
41821	gtccccaaac	cggagccgcg	gccccacgcc	cgccccgcct	gccagcctt	ctgcacKga
41881	cttgaagtga	atgaatcagc	cgcgcccggg	tgcgcgccca	ccacgtttcc	tgttttcttt
41941	ctcaactcct	cgggcggcag	gcgcagcgcg	gctccaacgc	cgacgttttc	cgggaaacact
42001	ccccctcacg	cccctctcgg	ccctcggcgc	tgccctggctc	ctcctcaacc	cccttacgaa
42061	aagattccga	attgcaaaag	cctgtcccgt	tccgtgccac	ccgcgcgctc	cttcccctcg
42121	agctctgccc	cgggggcccc	gccacctcgc	agtgccatcc	ccccggcgca	gcccggcgcc
42181	actcgctttg	aagtgcagac	gaggaggcgc	gggcgcgagc	gtgtgtgtct	gtggggctgc
42241	tgtagggactg	tctgtgctag	gagagcgggc	gaaaaccggg	cgtagagcgc	ctgcagcccg
42301	ccgtccgggg	tcgcgcccgc	cgcggggctc	aggagggacc	ggcacgcagg	cgcgacggcg
42361	cgcgacactg	tctcgctaga	accccgcgcg	ccccgcgag	ccactgccct	ccaggttgcc
42421	cagaccgctg	gagcctctgc	gactccacga	ccggctgctt	cctgcgaagt	ttcacaacaa
42481	aggttatatta	ggaccctcaa	ggtttctgag	ggtttaagtt	ttaggggttc	tggggggtcg
42541	tttctaaagg	cttaggattc	acctacttca	aggaggcagg	gttgtgggaa	ttaagaccgc
42601	attctttttc	taccagcccc	agtcctact	aagtaccaga	cttctaaatg	ttggggcgga
42661	cagaaacaag	caaaacaaat	atacaatggt	gtggggctcg	aacgctttat	aattcacaaa
42721	tttgacaata	ggctgcattt	tcatatgccg	aattgcctaa	gagttctctt	aaaggaacag
42781	caatgtgaaa	gaaccacatg	gtaaggagaa	tttacgcatg	tcctgcatac	tactcctttc
42841	ccctgtgaat	tgcataagac	ctagatgatc	ttggggccaag	gaagaaaaatc	tggaagggtg
42901	tttctaccca	ccatgtgcag	agtacactac	aattttgaga	aaacggaaaag	accatattca
42961	aaggcataca	gaaaagcctg	ttctgtttac	aaaggctgac	ccaggggcacc	agggacactg
43021	tccttaagca	gatcagttgt	gggagaactt	ttctacatta	gcatgcaata	agcaaacat
43081	tcatagttag	gagaagtcaa	actcccaagg	gtccatttga	taaaactttg	tcattgtcga
43141	gtggaaaagaa	gatactgaga	aacttacact	aagtgggtggg	aactctgtgc	tttgtctttg
43201	aatctacagg	tattggagaa	gaaattctgc	ccttgaaatt	tagactccat	aaattaacat
43261	ggcacaacaa	ataaagttca	tggaactgaat	ttaggctcct	gggatttttg	agatagcttt
43321	ttatgtgaac	tttgtaaaag	cttagagtaac	ttttaaagta	gttgttacat	gtgccacgtg
43381	gcttattgtt	atcaagaata	cttgaactat	ttactgttca	ctttgagtac	tctaggttaa
43441	aatttgcctc	ttttttgttc	tacttctctc	accccgagct	ctatgtaaat	atatacttta
43501	gatggacaaa	caactgccta	aaccttgcca	ggtgaattaa	agtttcagat	tgaaKctttt
43561	ttttccccct	taacaagctt	aaagatatta	ataattttta	atggttaata	taaaaacctt


```

43621 gctctgtata gcttcccaaa ttctaagaat gtaaaaaata ttacatgctt gttataaaaa
43681 ttgaagcatt acacacaaa ataggaagtc cattgtaacc ccacacccta aagatcacaa
43741 acaatacttt cgcctatggc tctaacacaa tcattttcat ttactgaat aacttcata
43801 tgcaagtata gcatcaccta gttgccatgg tagtgcattt actatatggg ttggttttga
43861 ttttttcctc tctctctcat tcccataata taggaatgta ggaaatttta agaggacatt
43921 gacttgtttt atgatcattt gagctgtcca tagttagcct atccagtggg ttaaagatgc
43981 ataaccattg tgtctgggat ttgttcagtg ccatcttttc aatcattggg tacaatgaag
44041 ctgggagtc cctctgaggt tcggcKttct gtggctcttc tcccctgcac tccaactttc
44101 tcaaagcctg agcctcaagt gatttcccag tagYtaagta aactgcccc ttctccatc
44161 ttcaccaagt tcccaaagct Kttcagactc aggcttcaaa tctaacagga tgtggctcca
44221 cacattatat ttcagttggt attttttaat gtggaaaaata attcaggaaa gttttggcta
44281 atgcttcaag acatcatgca ctttatacac aggatttgtt cttaagaagg tagtatagt
44341 acaggaggaa caatttactt cagaatatcc attttatgtc caagccatgc accagcatt
44401 tttgacagac aggatttgag tatgatgata aaatggggta agcatatatt ttaagttcta
44461 acatctgtat aaataagaaa aatgaaaaat cactggaaac catctacatg ctagtgaag
44521 aataattact aacagagtaa agtttgctct gtgaaactgt tgctcaataa aagaattatt
44581 cttgatatta gcatagagct gagaatattg cttttttcca aattcctagg tgagtggca
44641 atatagctag ccacgatttt tcaggatcat ttgtaaagct tcacttttag gaattttaac
44701 cccaagtgtt ctaagacatc aagtaactga ccttttcatc ccgccgaaca aacctcaag
44761 tggagttgcc aactatccca caggaaattg agtcaccaca ccaagcaaca cacctaaatg
44821 tcgacagcta gcaggacaaa aacagtgagc cagtttaatt ttggctttta ccaagaacac
44881 atactgcatt cattataaaa atacttcccc tcaacccctg ccagagtagt atacactgtg
44941 gctctcctta aaaatacatg aaaactcttt aactgcacca aatcttgcta agtcaaggaa
45001 cttaaacagag aaaaacaccc aMgcaaaaac tattggctaa actccctaaa ggctgggaga
45061 gggctatgga acagcaactg agaaataaat tgagccttga agggccctgc tacaacagca
45121 tcagttttct tcaaggcacc tttgaaatat gtaacacccg cattctgctg aggctcttct
45181 gtgaacaaac agtcctcaat tcttgccggc cagcacttgg cttctgtcac agtgatatgc
45241 tttagagttc ccctgacaca tggcctgaaa ctgtgccagg ggctccagga gaagctctg
45301 aagaagcagc ttcttttga aaaaggaaaa aagtaatcac ctacagacca cagcagttag
45361 ctagaggttg aggtcatttt ttgtgaaatg ttcagtccat tactcttacc cacaactcac
45421 agtgatgttg accattgagg taaaaggatc cactgtacgg gatgtgtaac tatgtggaca
45481 ttagtttctt tgccaacact tgaaggctcg cttaaaggact gtatcggctt gtcataatc
45541 ctagatagac ctattgggtat acatgaagag aacaagtcca aaaaatacca cttatttttg
45601 acactatttg tatgccctta atttaaaaaa aaaatacaaa ttataacagc tgaggtcggg
45661 cacagtggct cagcctgta atcccagcac ttggggaggc caaggcgggc agatcatgaa
45721 gtcaagagat caagaccatc ctggctaaca cagtgaacc ttggctctac taaaaataca
45781 aaatactagc cgtgcattgg ggcgggcgcc tgtagtccca gctactcggg aggtgaggc
45841 agggaatgg cgtgaacccg gcaggcagag gttgcagtaa gctgagattg ggccactgca
45901 ctccaacctg gacaacagca gaagactccg actcaaaaaa acaaaaaaaa ttatacaac
45961 tgatccagat tttttttatt attacacttt aagttctagg gtacatgtgc acaatgtgca
46021 ggttagtttc atatgtatac atgtgccatg ttggtgtgct gcaccattta actcctcatt
46081 tacattaggt atatctccta atgctatccc tcccccttcc cccaccccca cagcaggccc
46141 cgggtgtgta tgttccccct cctatgtcca tgtgttcgca ttgttcaatt cccacctatg
46201 agtgagaaca tgcggtatth gggtttttgt ccttgtgata gtttgctgag aatgatgggt
46261 tccaatttca tccatgttcc tacaaggagc atgaactcat cctttttcat ggctgcatag
46321 tattccatgg tgtatatgtg ccacattttc ttaatccagt ctatcattga tggacatttg
46381 ggttgggttc aagtctttgc tattgtgaat agtgccacaa taaacatacg tgtgcatgtg
46441 tctttatagc agcatgatth ataactcttt gggatatata ccagtaatgg gatggctggg
46501 tcaaatggta tttctagttc tagacccttg aggaatcgcc aactgtctt ccacaatggg
46561 tgaactagtt tacagtccca ccaacagtgt aaaagtgttc ctatttcttc acatcctctc
46621 cagcacctgt tgtttcctga ctttttaatg attgccattc taactgggtg gagatgggat
46681 ctcatgtgtg ttttgatttg catttctctg atggccagtc atgatgagca ctgatccaga
46741 ttttttaaaa ataaaagaac tacaacaaaa agctcctaag agcaataact taaatctccc
46801 taaccagttc cagcttctct tctcttaatt cttacaaaat ttcccccttg ttctaMggaa
46861 ggaattgata ctgtctacag tagatagaac tggaaaaaat gatttctgtt tcaccgtgta
46921 ttgctttgag ctagtcattc ctttagtttg ctacagtaaa agatttgtgt aggttaggtc
46981 taacttttgc tgacttaatt ttttttctc tatacatttt atctgatggg aaatacatga
47041 aggctttgga ttctctttca atgtgtacat gtaatagggt taagcagagt ttgctagtgg
47101 caagctgtct tcatctccaa gtgtatttct ggcataaat tattgttttg aagtatttta
47161 aaattgtata aaatatataa aacttttatt agtacttcat aaagcttcca aaggaaagat
47221 gtgtgcaatt ttgtgacggt tttcttttcc ttttatcttc tcactaacta caattgtttt

```

47281	tccgaatggt	gcctatgcct	ctagtagaat	ttttatatga	aataaacatg	agggtggcct
47341	tcattgactt	ttagtcccac	cagtaactca	acatttattt	agcactgact	atgtgccatg
47401	cactttatta	gaggctgcag	aaacaagatg	atgaaaagag	tgtgtccctt	acccagagtc
47461	cagcagagga	ggtaatttca	gcaaacaact	gtagagtga	ctctcacaga	aggaagcatg
47521	tgggctatgg	gacagtaaaa	gaggactatt	taaatacagac	agggacagag	gtggagtggg
47581	aaaaggctga	gtcctcaaga	atgaaataaa	agagagtggg	aaggattttt	aagagaaaag
47641	atgagcaagc	acacagacct	atgatgaaca	agatgtctgt	gtcggccagg	cgtggtggct
47701	cacgcctgta	atcccagcac	tttgggaggc	cgagggtggg	ggatcacctg	aggtcgggag
47761	ttcaagacca	gcctgatcca	catggagaaa	ccctgtctct	actaaaaata	caaaattagt
47821	cgggcttggg	ggcacatgcc	tatatcccca	gctacttggg	aggctgaggc	aggagaatcg
47881	cttgaacctg	ggagatagag	gttgacgtga	cgagaggttg	cgccattgca	ctccagcctg
47941	ggcaacaaga	gcataaaaaa	tctgtctcaa	aaaaaaaaaa	aaaaaaaaaa	aagatgtgtg
48001	tgtcaaaaaa	gaaataacca	tgtagtgggc	cttgcttagg	ggaacagatt	ctggagaaat
48061	ctgagaaatc	ctcagccact	ggccatctca	aagactggcc	atgtcaggca	tctgcaggta
48121	ggactatatc	ttcaagagta	ggagtccacag	agtgaactcag	agtactgtgt	gacatgggat
48181	ctgattttat	tttatatgga	aaattctagt	gctatgcaat	taatggaatt	Kaagaaagta
48241	aagttgaaat	cagtgaacc	attatctttg	accatattaa	gaataaaaatt	aaataactta
48301	tagaccattt	gcttctctga	cgattattct	tatctaagac	aatctctgta	ttaaaatcct
48361	acgcagacat	atgttcccac	aatatgtcag	gtatgaacag	aaggactgcc	caatgtgact
48421	tgaaggagg	tggacttctt	gctcttaaaa	actacaacct	tgtagtcaat	aacttattaa
48481	tcatactgta	ataagatgga	gaaaaaaaca	atggaattca	ccagaatttc	tttcacgaga
48541	gtctgcctgc	attaaaatgt	tcgataaagc	tatttatgac	agaagggtgag	actttgaaga
48601	gctttggttt	gggtggaact	aatctgtgcc	tcacttacac	aggaaggggg	aggaatatgc
48661	cagttgctag	agagggaata	tgtatgtgtg	tgcattgtgt	taagcgcag	agagagcgag
48721	agaatgtgtg	tttgtgcaca	tgcattgtgt	tgtgtgtaag	agaaaggagt	cagcttgggc
48781	tctgtgtgtg	catgtatgta	agggcatgaa	agagtgtgag	agagagagag	aatgtgtgtg
48841	tgtgtgtgtg	tgtgtatgtg	tgtgttaagag	aaaggagtca	gcttgggtcta	aagggttaact
48901	caaatttgta	caattttcct	ttctcccaat	catcaataag	gttattgaaag	atgtgtgtgt
48961	gtgtgtgtgt	gtgtgtgcat	ataagagaaa	ggagtcagct	tgggtctaaag	ggtaactcca
49021	accctgtcat	tttccctttc	tcccaatcgt	caataagggt	actgaaggta	caaaatcccc
49081	acttgttttg	ttttgtttta	ttcattgaag	ggactgagct	tgaaggccag	attggcccaa
49141	gcagaaatgt	ctctctgagc	tgacataaga	gaagagtcaa	agaaagagga	gaaagctttt
49201	ataagaataa	ggaggccttt	tgtccaaaaa	attggagtgt	gagctaagtt	taattaggca
49261	tctagggttg	gggcttcatt	tgacatgtgt	gcaactgtga	gtgatattat	tctttgaaag
49321	aaactggaag	agtggagaaa	gattccaatc	tctattccac	ttcatacaag	caattccagg
49381	caattcagct	actaatcttt	ctagggcctt	atttcaccta	tagattggag	ataataacaa
49441	gagccttgta	agttattttt	gttcaagtga	gaggttgtga	gttaataaat	cttgcatgta
49501	ttgcctaata	gattcttttc	cccttctcct	ccattgtatc	ttcactttct	cctggactca
49561	agtctctaac	ttaaatgcaa	acattctatt	aattttagtg	agcctatcaa	ctaataccta
49621	ggtataacct	cggggtccag	aaacttaata	gWtacctgga	acagttttta	gggtagttag
49681	aaagaaaaaa	gaatttcaag	gaatgaacag	ggattcattc	tgaagaagtt	cacttagaga
49741	acacaggcca	ttcaggaagc	tacaaacagg	tagggatata	aagtttagat	cagacagtgg
49801	acaaagataa	agatggagaa	ctagtcttgg	aggacttgta	tactattcta	agacaatatt
49861	ttcttctaaa	gaggccatta	aaaatcttct	aagttaggaa	gtcacatggg	cagatttgct
49921	tttcaaaaag	attactctgg	gaatagtata	aaggcagatc	agaaaagtaa	agaccagtta
49981	agaggtttgt	gaccagataa	ggagaaaaatc	ctaagcagtc	cctgaagggg	aaggagaagc
50041	tgcagaaagt	taggaggaag	aactctcagg	agcaaaagaa	aaggaaatgt	caaaggaaaa
50101	tattgttatg	gactgaatgt	ttgtgtctct	ccaatattca	tatgctgaaa	tctaatcccc
50161	ggtgtcacgg	tatttggagg	gaaagccctt	cggagtaaat	taggtcatga	gaatggagcc
50221	ctcatgaatt	agattcgtgc	cattataaga	agaggccaga	ggttgctctc	tttctacccat
50281	gtggatacat	gctatgtggg	cagtctgcaa	ccctgaagat	gccctcacca	gaacctgact
50341	atgctgacac	cctgatctca	gacttccagc	tcccagaact	gtgagaaata	aaWgttggt
50401	gtttaagcca	tcagtttatg	gtattttgtt	atagcagctt	gagctaagac	aaatatcaag
50461	gctttgccat	tgatattcag	tacagaccgt	atatacccac	aggtttgcgc	taagataatt
50521	ttcattccaa	acacatattt	cagcaacaca	agactaaaga	gggtgttaaa	gaatgctact
50581	gaggaagcct	ttgtctggga	agttgtttga	acaaagttac	aggacaattt	ttgcaaacag
50641	gtttaaaaaa	agttacaatt	atgtatgcta	tttacgtatt	cttgttgtaa	ttttaggaaat
50701	caatttttatt	ttcctggggg	gactgttaga	gagcatctgt	gtttccatca	tatactatca
50761	atcttaggat	ataacagctc	tttgttcttc	acctttgtca	attactgcat	acagatttcc
50821	ttagagaaaa	caaggagttt	gaacagatta	tcttttagcac	ctacccagct	ctaacattca
50881	tttattatct	gatttctgaa	attgtactat	ctggggttagg	tggttggttt	aagggtgttc

P A T E N T
Docket SEQ-4095-PV

50941	attatagtta	gcctggatgg	ggtcagctat	gtttgtagag	ggaattccta	aactgaccag
51001	ttactttgtca	aggatcccat	ccaataccat	gatcctggaa	ttctgtgagt	ttagctcaac
51061	tgttcttcag	gggtacatgt	ttctatattg	aaattgaggt	atYctcagaa	ataaagctat
51121	taataaataag	aaagtctctgg	agtatatatta	cactcactct	gcttatctcc	actcctaccc
51181	ctaccaatatt	cccatccaat	actttgccag	ttgacttacc	aatttcttct	taatttctgt
51241	aactgtcacc	ttcagtcaaa	ttctcatctg	tgtatttcta	gattcatata	atgggtctact
51301	actggatctc	cttggattca	ctttttctca	acacagtcct	atttataaag	tcagaataat
51361	cttctttaa	ccctggtttt	attgtttcat	tcttttaaga	acctgtcgca	caactctctc
51421	ctactttattg	tattaatgtc	acacttctgt	tcacataggc	ctttttcggc	tgcttttcaa
51481	tacctttccc	ttttattttac	atctaagact	atccccatcca	agactgccca	tcttagccaa
51541	tctttccacc	tggaaaataat	ttgctggctt	ctgcctgtat	gacttttcta	atgtcatttt
51601	tatatattgtg	tctaggcctt	tctataactg	tctagaaaat	tcctgacatt	tacaggcact
51661	cagcaaatat	ttgtgagtga	ataatcagta	agtatgcttg	ttttctatca	gataagaata
51721	tttatttcca	aaYgagattc	aaacagtaat	actggcctgg	gtgtggcttc	ctacatgtaa
51781	tcaccctcgt	ctatctcttg	ttctcagctc	tttgccttca	aactctttct	ctttttttaa
51841	aagagtatta	ggaactaaca	ttgccaaaa	ttggtaatgg	tcaagcagat	catgggtctc
51901	tactgaagtg	aaatattaac	attaaaaata	aaatgacaag	tattatggta	tatcattcat
51961	atgtaatgat	ccttacaaaa	tagagtaaaa	ttttaaaaga	attcaccaat	acaccagtat
52021	gatgtttggg	agaaacagat	gaatgcacaa	aggtgcatct	gatgcaaaaa	ccccagaaa
52081	aatgagcata	agttcatatt	atcaatattt	ttcactctaa	aagtgttcac	tgacttccct
52141	gaagtcacca	aggactccaa	gttaagaata	ctttcctgag	tgaagaaaag	aaagcaatta
52201	ttttaatcaa	cactgcccca	gaatctttta	ttcggaaatcg	ctatctctgc	tttcttcttc
52261	ttcttttttt	taactttctc	ataaatctct	gttttagcatt	tatatctctc	tcactatgag
52321	ataccttaag	gttaagaagt	aatgccaaa	agacatttgt	ccagttgaag	actgggatta
52381	agaaaaaaca	cacagccggg	catgggtggct	catgtctgta	atcccagcct	tttgggaacc
52441	caaggcaggt	ggatcacctg	aggtcaagag	tttgagacca	gcctggccaa	catgatgaac
52501	cccactctcta	ctaaagaaa	tacaaaacat	tagccacgca	tggtggcggg	tgctgtaat
52561	cccagctact	tgggagcgtg	aggcaggaga	atcacttgaa	cccgggaggc	ggaggttaca
52621	gtgagccgag	attgtgccac	tgactccag	cctgggcaat	aagagcgaaa	ctctgtccca
52681	aaaaaagaga	aaaagaaaag	aaaaaacaca	caaaagattt	cccgaagaa	ctaggccctt
52741	ttaaacaggc	tatgaacaga	gtctcagaaa	ggtaatttct	tatgtacaat	ttttaatctc
52801	attacttgca	ttacaagcaa	cacatatgag	tgataaaacta	ttttggccta	ctgggtaaac
52861	tacatttgtt	aactgtgtgt	gcattataga	gaacaaat	cagaactcaa	gagtatatcg
52921	gttatatttg	gcttatccag	ttgtatatga	actggctcca	tacacgaata	agataaatta
52981	gtttttataat	tttacaagaa	tatctatgga	gatttagatt	tggctaagaa	agttattata
53041	cacacagaag	aatccacaac	ctataagagc	tcttcatggg	aaatagtgtg	atagatcaga
53101	aagagcatgg	actttttgag	cactcagaac	ttgaattcca	gccttgccat	tgttctagtt
53161	gtattatctg	aaataagcca	tttaaaagac	ctgagcacat	tgtatacat	gagaattaca
53221	gggttattat	gagaaatgca	taagaaatgt	aaagtaccaa	gggctgtatc	tgacatatag
53281	aaggatttca	atcaatagta	ggtatactga	accactttgc	agagtgtgtt	aaataagtta
53341	attttaata	aggtagttaa	tatttgagag	tttcttccct	tttccacaga	ttctcaatcc
53401	taaaacagtt	actatttttc	catcatcacc	atcaaccctc	aaatattaac	cagttctgag
53461	ccaaatgtga	gtgaacaacc	tatgatttag	aatagctttt	agaccaggca	cagtggctta
53521	cgcctgtaat	cccagcactc	tgggaggctg	atgagagcag	atcacttgag	gccaggagtt
53581	caagaccagc	ctagacaaca	tggcaaaaacc	gcactctctac	taaaaataca	aaaagttagcc
53641	aggtgtgtgt	ggcacatgtc	tgtagtcca	gcttcttggg	aggctgaggc	aggagaatca
53701	attgaaccct	ggaggtggag	gagatggtgc	cactgcactc	cagcctgggc	aacagagtga
53761	gactctgtct	caaaaaacaa	caacaacaa	aatagaatag	cttttacaag	accacacca
53821	atcatgaaaa	gtcaactatg	taggaagaat	atgtatttgt	cattgggtta	tgacagagca
53881	tcactttacac	tgaggttact	gggaagatca	tttcaaacat	ttcccaaaga	atgttccaat
53941	caatattgtc	cttataagat	tctccttact	aatgacgttt	tgtggtcaaa	caagcttggg
54001	aaatattgta	tatgtaggct	ttttacagtg	atttctaattg	gacacgaacc	tacaaaaagc
54061	tagaaggctc	acagcaaaat	gagatattta	attttattaa	caagcattat	ctaaacctgt
54121	ttgattttag	aatgcatttt	tcacacaaca	actatcacct	cttgaagaat	acctggaata
54181	ggttttccta	tacctatacc	tatatgtcag	gtaactccaa	aacattaaca	aatacatgtg
54241	tttagtaggt	tcccatatgg	ttgaaatctc	cactaacgac	attttatttc	tcttctctct
54301	gactttgtat	gctatcgaga	aatggtcaga	gagtaatctt	cctccctccc	tttcttctt
54361	tctttctctc	tttttccccc	tgaagagaaa	tagtcaaaaa	atccatacat	atttattgag
54421	cctctctgat	gtgatatgtg	ctgtgaaata	caagaacatg	aaagattcag	cagcctgggc
54481	ccaggaagga	accataataa	cctgctgaga	aaatcagaca	catgatcggc	tgctgcttag
54541	agacagtgtg	aggtagcata	taaatcattc	agcctgggag	tgctactgta	gttcgagcag

54601	ggagagggag	gtagggacta	tagctcagtg	tgctgggttt	caggaagaag	gtgaacttgg
54661	atgtaggtct	tcaaggaaga	ctgtgggttt	aatggctgtg	ggaggagggg	gtccgctggc
54721	attgttttca	ggYgtaggaa	atgtctgcag	cctgaataaa	ggttgtatgt	gtggacagta
54781	aatgggctgg	gtggagtaga	cacattccag	ggaggagaa	ggatatagag	ttgaacactt
54841	aaatgtgtgg	ccttgagcta	gtggatatgt	tggaatttgg	ataagtgcac	tggtagccta
54901	agaggataga	atggagaaga	gagaaggatg	gagactaagg	agctatttgg	gtagtccaga
54961	tgcagtggaa	agcaaagagt	tgtggaggta	tccacttttag	tggtctacga	tgacagttac
55021	aagcaataga	aagagtatga	cttgggaaca	gtggttcaaa	tgctggctct	gcaacttagc
55081	aaccatgggg	caaatttggg	caaattaact	tctctgtacc	tcagttttct	tttttgtaaa
55141	atagggctaa	aaatacattc	cctagaaggt	ggcctccagg	ccattttccc	acactttatt
55201	tgaatgttaa	aactaacttt	aatctaaaaa	tcatatattc	atatctctat	cttttttggc
55261	ggttcagttc	aacttaaatg	tgttatttgt	taaaaacttg	taattatcat	ctattacatg
55321	taaaaataaa	gagctgcttt	taatagtaat	tcatctcctc	cctatctttt	tttaaacat
55381	ggtcaaaatt	aacaaaaaca	tcttgatttt	ttgatactag	tagtgggtatc	actactacta
55441	gaggtacaag	gactcttgta	cctctctgaa	aagtagcata	attagcaaca	gtattgatgg
55501	tatctgctat	tttagattat	ttaaactgta	gtcactaagg	taagcaaggg	gaagaaggca
55561	tgtcatttat	gtgtttttca	tctttaagat	tagcgttttg	aagcatatat	tattccacag
55621	caatctggat	aggtcttgcc	atgccctgat	cttgtaagcc	caaattttat	tttgaatact
55681	ccagctttgc	acttaaatga	cagctccttg	ataaaagaaa	aacaattgcc	taacaatttt
55741	cttccaattg	tctgaaaaa	taatgggtgt	acatacacac	acacacacac	acacacacac
55801	acacacacac	acacacacaa	tctctagggc	atattttacta	gatagtatta	tgtaatgtgt
55861	agacattttt	aattatgata	attaagacaa	aaatatgtgt	agcaagtttt	tgatttgaga
55921	caaatttgag	atttactaaa	attattatat	gtgtgtcctt	ctgaagactt	catattttca
55981	ttatatatct	tcatcttga	agtataactc	ttaaattgtt	gaattaaagt	ttatgaattt
56041	agttgttttg	ttttttgttt	ttttttgttg	ttgttttttt	tttttggcca	ggcacggctg
56101	ctcatgcctg	taatcccagc	actttgggaa	gtcggaggtg	gcagatgact	tgaggccagg
56161	aatttgagac	cagcctggcc	atcaaagcaa	aaccccatct	ctactaaatc	taatcttgtg
56221	cctcaagcga	ggcacaaagc	tcacttgaa	ctgggaggca	gaggttgca	tgagctcaga
56281	tcgtgccact	gcactccagc	ctcagggaca	gagtgagatt	ctgtctcaaa	agaaaaaaat
56341	ttttttccat	ttttaccaat	accactatct	tcaattcatc	cactatttca	ctaggaattt
56401	ctaattcagt	ttacataaatt	tattcaatga	ataaattatt	caatgaagaa	gcttctgggt
56461	attttaggta	tacatgctaa	tttcaattgg	catattttgt	ttttcaaatt	tggttctggg
56521	gacccaataa	ttatacctgt	ccaccttgaa	agtgtctttc	ttcatcacct	tcaaggccac
56581	cgctaacaag	acctttgaaa	agaagtaaac	agttagagaat	ttcaacttct	gtgatgacca
56641	ccgtcttctt	ctgaatcccc	agactccact	catacaaggt	tttggggaag	tttaaatgaa
56701	atgaagcagt	ggcttacaaa	gtttattgac	agtaaaactac	agtaaaattt	atattttata
56761	ctataacctg	gtagatttgt	ttaaagtaag	aggtgctcac	ttttgaaggc	atgtggatgc
56821	tggctttcag	taatatataaa	aaaatgtaca	aaaagggttt	atacctatat	ttatttttaa
56881	aaggtagagg	agagcagtg	actcctattt	aaagaaactc	ttgtgtttta	taataatag
56941	tcattggcaaa	atgtgtttac	agtctttaac	aaaccatgca	tttcagtata	aattaaacca
57001	ataaaaagaa	ttatatatat	aaaataaaaa	ggaaatgtat	atataggaac	agtatatacc
57061	atacacataa	gagtaaatat	atattcgagc	caatacagag	aattgaacaa	taatttaaca
57121	tgaaataaca	tttatcctta	ctatgtatga	ttcactctga	tgttttctat	ttWatttaatt
57181	tttaaagtat	taattgtgac	cccttaaaat	gattttgaaa	tctaccaatt	ggtttgaaaa
57241	cactgaggta	agaaattacc	ttgcttaata	aatgttagtt	ttgtttccct	cttccctctt
57301	cctccctttt	tataattaaa	aaactctccc	tctacttctc	tacttcacgt	gagagttagaa
57361	cacataaaaa	gatttcagtt	aactactgtg	catatttttt	gaagtaattt	ctccataatg
57421	tgtgagtttt	ctcagggtac	tacaagttta	ccaacagaa	acataaagca	gcggccactc
57481	actgaaatgc	ctataggaga	cagatagacc	atatgaatga	atgaatgaca	tgggtgtctg
57541	gcacccctgt	tgcaagtggc	agaactgtgg	agggtaggag	cagaccacca	tatatcctag
57601	gcattttcatt	ggcaaatgaa	caggagaagg	acacctttcc	gtttggccct	cattttccta
57661	gatctttcct	cccttcctct	gtcaatccct	cctacatagc	ctatgttccc	aaagcacccc
57721	ttgtattata	ataataatta	ttatgatata	tgctcttaat	caagaactta	tactggattt
57781	ttaatgcctt	taggtcttcc	ccaaacttca	gttcatctat	tcgaagtccc	tataaaactc
57841	acctccttag	acttgctctg	ccccattatt	ccctgtgggt	tgacctcacc	tccatctcta
57901	tcttttgtca	gcaagtttcc	tcagagttcc	ctctctgcac	acttggtcat	gctgggttat
57961	tgttttttgc	cacttgatca	tctagacctt	tttccctctt	tccctccttc	tattcaattt
58021	ctgccctttca	ctgctgtaca	aaggaggggc	agggaggccc	tccagggtgg	agggaaatcag
58081	tcttgagata	actgagagat	tcagggtgat	gagtcacaaa	gttgaaagaga	atccacatac
58141	ttcttctgtt	tttgttttca	ctagcaagga	gccttttcta	tagacaaagt	tRggaaacca
58201	gaggttatga	cgtgattcat	ctttgcctac	ttaaacttta	gcttgattca	tcacttctca

```

58261 acaataactt gttgaacccc accagtaata cgagaagctt ggtattctat gagggtgctca
58321 acttccaaag cttagtctcag aagaattctg gcctcaaggc gtctaccatc tagaagcaaaa
58381 caactaacia atgaacaaat gcagtgattt caaaagaaat taagggtgtgc tgtggtagag
58441 gcatgcacag gtcagaaaaag ttcagagggt ccagacaggc ttctctgggga ggatatccat
58501 gccccScctc cacctggtag ttcatgatca gagtttgcaa gcttggctgg gatagaggga
58561 atagcgtgtg aaccacagaa ggagtggtac tgggtggtca gacacggcaa gaaccagctc
58621 atggcactag gctgcaggca caccatgcac aaaacagtct tttctttccc cagttctcca
58681 aattctctaa agtggaagcc taggggtgag ggtaagaagg aggtaggaag ctacaaccac
58741 tggagcaaa gacgaaagaa ggggcttgag tgtctaaaag tgcagaaact caaccagctg
58801 gacgctgaga caatgtttaa aaaggagttt ttttgtttgt ttgttttctt gtgttttttt
58861 ttacttttaag ttctgggata catgtgcaga acgtgcaggt ttattacata ggtatacatg
58921 tgctatgggt gtttactgca cccatcagcc caaactaggt ttttaagacc gcattgcattc
58981 ggtatttgta ctaatgttct tctcccccct gctcccccaa ccccaccag gcccagtggt
59041 gtgatgttcc cctccctgtg tccatgtgtt ctcatgttcc aactcccact tatgagtgtg
59101 aacatgcagt gtttctgttt ctgttctgtg gttagtttgc tgagaatgat ggcttccagc
59161 ttcattcacg tccctgcaaa ggacataaac tcattctttt ttatggctgc atagtactcc
59221 atgggtgtata tgtgccacat taaaaatgac tttttaaagt ggcaactgtg ggaggcaaa
59281 gagaaaaaac aggagctgcc agataaggga gtgaagagaa ccagcactt tgagaattcc
59341 gttacatttt gcagcttgaa ttcttcaact tttgctccca ttatgtgcct ctttctcctc
59401 tccatgaact gggccctgtg gaccaggtat cctgctgtct ttgcagggca aagaatgggt
59461 agaaatgaat tcattaaagg gagaaacat tgctggcata attctccttc acggaacact
59521 ggcacttaaa tttaacctgt ttggttagat ccagctctgc ctccccatt tYtttctgca
59581 gaacaaggcc tggcagatcc ctgttctctc taatccttga atggacaaa tgctgggtta
59641 tgctggggca gtgagggacc ttacaacac ctaaatttta gagaacagtt ttggagtaa
59701 ggcagtcctt gtttccaaat ctgagctttg ccaactgaYtg actagcttgg cacctataa
59761 aagtgaatta acctagcttg ttttctaatt tataaaatgg agaaagcagt acctatatca
59821 cagtatgatt ctgaaaatta tttaaatagg actatgtatg taaagcagt cctgaaaaat
59881 agcaagtgtt cctaaagtca ctatgatgat gaattttata tgcaggcacc tagagcattg
59941 taggattttt gggatctttc ccagctcaca ctgaagcttc actcttctcc aacagtctgt
60001 tatccaatgc tggataactg agatagtctt ccagcattt atcaatgtgg ttaggaacag
60061 taatcctgga aagcattctc aaattattta tctaattaaa caagcaaac tttttagccc
60121 agacatccta aatctctgta gctgtcttcc gctgatttgg tcagaatagc tcagatggt
60181 ggaagggctt tctgggtaga aaaaaataaa ttagcagctc ggaaaacaaa agatctctgc
60241 ttaaaagagt ctctaaacac gcctgatcag cctgtgtatt ttgccatatt atctagcatt
60301 agtaggggac tgggaaaaat ccagggtccc ttgtagagat agagactggc aaatattatg
60361 ttgatgcatt gagaacaaaa tcagaagtta actctttaag ttattaaatc actaacagat
60421 ctatcacaat tatgtgttta ttactagact gaatttctct ggggctggaa ccataatgaa
60481 ttcatTTTT gatctctggt gctaaacact ggctgtcata tactagggtat ccaataatg
60541 ttgttgaat ggaactgaaa aagcatgaaa cacttccctt gtttaaggctt cttttctata
60601 atatttccat agtttctaata gcatctgaga atcattaact ggactgttag aggaatatga
60661 atatgggtta gggagctaca aacttcatgc tctgagatgt cacatgatta gtgtaacttt
60721 tgttccaggg gagagaaatc cctaagagag tgactgttct ccattggccc ccaccacag
60781 tgcctatag agcctttcat tctccagatg cctataatga ctatcacatt gatttgttta
60841 catatctatt gccttgtctt ccttataggt acagagtcca tacatcctaa ttggcctgga
60901 acttccaagg tctatgcctg ttataaccagt gtaattatga atagcattgc ctttcatctc
60961 aaaaagtgtt ctgggttgaa tgctaaatca tctagacacc ctacttatga gagggttcac
61021 tgtacatcgt ttagtcccc aactccccct cccttggaat tctgggtact accctctacc
61081 gggggctttc cactatggag gcagctctct caatcacagc attcaggagg tgtaagtcca
61141 ctcccaacag aacagacacc tgtctacaaa gagactcttg gtggaagaaa aaaaaaatc
61201 acttccgtaa gtttaagtct tctttttaa cttgggtctc ttttgcacat cagaaacaaa
61261 gaatctctaa taattacatc cctaaatgta ctgaagtcta gaagacatgc ccttaataat
61321 actctaactc agtaattaaa gcttctcagg ttaaactgca ccttaataat gtagcttatt
61381 ttgtcaagat cagttaaggc cctgtaatgt gatttggaat aaatggacag acagaaatta
61441 aaatgtgctg gacaaggtaa tcagaatctc cacttcattt agtcaataac aatggcaatt
61501 cagcgggttc cttttactac tgggatgtaa ttgtgcttgg ctttaatttc ttgtaatgat
61561 ggaacaaatt aaattacttc atacttttag gaacatttgg ctacatcatg ttttggYgct
61621 tccataaac ccactggaaa ttaaactcagc tctgtggttg ctcatctctc cttcttagtg
61681 ccatgtctgc cttctgtcag caaaatggtt atattgtcta ccttaatcca ccagatgcag
61741 ttgagttaaa agaaattacc tctcccacct ctttctcttc aaatctccct atttgtagct
61801 atcaaatTTT ggcattgcct ctggaacaca gtctgttag aacaagcag gtaattctct
61861 cgtgagactt taggactctc tctacgacaa ggtcagaatg tacctgtgat tcaaatTTag

```

61921	atgaggatat	gagttggttaa	gaacatgaag	agcatcagac	agtttttcagg	acacccacta
61981	ctttttat	gtgctatcag	tttttccttt	cccaaattgc	aggtggagat	gcaatcttta
62041	acgctggaaa	tctcttgcta	tatgccatta	aaattaatta	gtctagcaca	ttttatcttt
62101	aggcccttac	ctagggcagg	taaaatattc	tagcacaaaa	taacacaact	ttcctgaaca
62161	ccatggctac	taagttcata	tggtaaagat	tatactatac	attaccttgc	aaatagagtg
62221	ttgcagactg	atattaaata	tttaaaatgt	atgcaggatt	attaataggc	aacattgtgg
62281	cagagactgc	taaattgtccc	ctaattattga	tgcttttctt	catcacttgt	tttcaaatac
62341	ctgttttcat	gtaagcatgt	gactgcccaa	aatagagaaa	attcacagcc	tccttggttg
62401	ccagggtgtg	ccatataact	aagtttttgt	gaatgagttg	gtagtagaag	cgttatgtag
62461	atatttatatg	atgtgctaga	aacttccctt	aagagaaatt	tgctatctat	ctttttatct
62521	gcctgtat	attgttttct	ctttcctact	ggctagaatg	tgaagtgtat	ggctggagtc
62581	ggagcagcca	tattggatgg	tgagttgaat	ttagcaacag	aggctacacc	tcacagtgc
62641	ataagatgga	aagagcacgt	gtccttgaag	actgtactgg	atagaggtgc	catattaaac
62701	tcggactgcc	aactttcaga	ttttacatga	aggagaaata	tctgtcttcc	ttaagccact
62761	tctatttttaa	atctctctat	ttactgtctga	ataaaatctc	aactaacgca	aacaccaata
62821	acaaaaaatt	cctattcact	catgatatag	gattatactc	tagtcttttt	tggtgcatat
62881	atctgttcat	tcaccatttt	tgctttgatg	ttcaataaac	atctcaaat	taacatatct
62941	ataaaaat	tttaaaat	acgttcagg	gtatatgtgc	aggtagtca	tataggtaaa
63001	ttgcattgca	tggtgtgctg	gtgtacagat	tatttcacac	cgaggttaata	agcatagtac
63061	ccctacagct	tagtcttaag	aagaagtatg	ttcacatagg	ccaggctgag	acttggatgt
63121	tggtgactat	tcttccagct	tactctgatt	tgaatatatt	gtgtggtagt	agatggctaa
63181	actgcttget	ccaaaaactat	ctgacaatgc	tttttagaaa	gtctgccaaa	caaaactaca
63241	agaatcacc	tggtgcttcc	cttaggcttc	agatatattgt	cttccctgcc	ctacttgaaa
63301	atcatttccag	cctggaagct	attgtgagga	acaaaaaat	ggtctcccta	ccatgaagaa
63361	taacactgct	tccattgttg	ggaggctctc	cttccctacag	gcactgtccc	tcactcatta
63421	gacacttgaa	taataaggat	gttcatataat	ttatttggtg	tggtatcagt	tagacagttg
63481	aatgatacaa	atgttcatat	atttcttctt	attcaatagt	ctcacagaa	cactattctt
63541	gtaaagtcat	taaaaactgg	atggtctt	cataattatt	tccatgattt	gtcatctaaa
63601	gccagtgttc	tctcctcctg	tcaatctgat	agctttaaag	ctaagtctcg	ggtgggtcca
63661	agtcattgct	gaaaggttta	tcaaattgaca	tattgcagtc	atatggtcgg	agcacaaaca
63721	cctctgaatg	tacaatattt	taaagcaaaa	cagtttatgt	gtaagctcta	tgaggttacg
63781	gaccatgact	atcttatttt	ttaccaaact	cccagctcct	agaacagtg	ccctcaata
63841	aaatctgtca	aatgaataaa	cgaagagttt	gcctgcagta	gtaaacttgt	tatttgcaca
63901	cactcgaggc	ccacctctat	gtgtacattg	tcagtgtg	agcctcgtg	atgactctgc
63961	aggactgtct	gtataacat	cactacagtt	accaggggac	ccaattttca	taaattgtct
64021	cagcatcaca	ccctcctctt	acagagactc	ttcctgtcca	ttctaattcc	tgacacgttg
64081	tcactctcac	tcagattccc	caatagatag	aaatgctgtt	aaatatactt	gggtagagag
64141	ggataggcat	gctcaaactc	Sttttgggaa	aaaaaattgc	aactgtcaga	aatgtgttag
64201	ctatctctcac	agattatgaa	acataaatat	caattatctg	ttcacacgag	tgaagcctg
64261	cataattttt	taagatagca	agtataaaac	ggctataagt	accatgttga	gtagagacct
64321	accaccgaag	tagagacctt	cactgaaata	gtgaagggat	ggttgtgttg	cagggtcaga
64381	atgattaccc	actggttgac	actccctcca	ggactaaagg	cagcatcacc	agcgtccact
64441	ctgcttctcc	actgcttact	gttaaggagc	aaggcaatag	cattatctaa	gtaggaaacta
64501	cttcattctt	tcaaaacctg	gaatcggtcg	atcagaagaa	gaaaaacagt	ataaaaatac
64561	agaaagacaa	gattctctgg	ctgtccta	gaatgctagc	tagctataat	agcatggata
64621	agacataata	ccaaacatat	aagatctatt	aattaaaggg	aatctctatt	tgtattaaact
64681	catctatttt	ctctaaaacc	agtatttagt	tatctcccat	acattggcat	atttgttata
64741	tttgagaat	tcaaaatggt	actgatgtga	cttttttcca	tcagacatct	gagctatccc
64801	tcaactaata	gttgagctgt	tcctctatag	ctcagtatct	gagttagaac	tcgaagtaaa
64861	aagggtataaa	taagtcatgc	tataaaattc	aaaggcaatc	agatgtttga	gactatagtt
64921	atacagaaaa	gtgtccttgt	tcttgggagg	aatacatcga	ggagtttagg	gatagagggc
64981	tatgatgtgt	gcagttttct	ctcaggtgtg	tcagagaaaa	aaagacaatg	tgtgtgtatg
65041	tataatttgc	tgtatgtgca	catagagtga	tactgcaaat	gaggtggaat	gtttacaatg
65101	agtgaatgca	tgtgtgtttt	tttttttttt	tgcaactacc	atgaagcttt	ccagtgtgtc
65161	tgaataaact	tccagataaa	acttttttta	aaggcaatca	gaacagtggc	aatgaataat
65221	tcaattattt	catatttgag	ctgtctttcc	tgccaccccc	acccctata	acactacata
65281	catacatagg	ctcacataag	tgacacttac	tatacttttt	tgccatagta	atgagtgttg
65341	gcgaagtacg	tgagtgggaa	attcagttct	ttgcattcaa	gctctaagta	attctaagag
65401	accttttaga	taatgatgtg	actttttaaga	caacaatttt	gaggttataa	tatgatgtca
65461	tttcatataa	acagaactgc	ccttttgtcc	tttcagattt	gattgaaaa	ggcccatgga
65521	gtacaaccac	ctgggaacat	atcctcgaga	aagacagttg	aggcttattg	cctaaaccac

65581	aggctactga	aaacttgGCC	aaaggcgact	actctagact	ggTgacttca	aaagtGctga
65641	tgaatacagt	gaaccatgaa	agatgcatta	tttGttttga	acattttact	atgattgatg
65701	accCagattt	ggcaagttag	ttcactccca	gtggagatga	aagtttCact	gccttctttc
65761	tttcaacatt	cttGtttgaga	cagatttcac	ttttattggc	caatgtacta	acaaatcact
65821	tgcatttgca	gcataatgaa	ttcatttagca	acactgtgga	tcaatgctat	acataatatt
65881	cctgagtgca	cattaactct	taattaaact	tccttattat	aatgcctctg	gaaattttcc
65941	ttcaggctac	taaacttcaa	gccaacagtc	taagtgttaa	tcagtaatca	tgctagtaac
66001	tttttgagat	gggtcagggc	cagggccagg	gtcagtgatc	catcatgaat	ggcaggttta
66061	aaaatggata	tacgtgatca	aaaataccCa	taagtTgacc	aaagcattct	aaccttgggg
66121	ttatttctaac	actcagtgta	tcagccttct	gagcaagcca	attttttatt	gccttaaaaa
66181	gtctaaaaaga	aagataaaaa	cagagataat	cagttttgtt	tggcaatggc	aggggtgtgg
66241	gaaatgaaaa	agaagaaagt	taaagatgag	tgaaaaatagg	atagtcttgg	cactttggta
66301	tgaaattgaa	gtacttattt	aaactgatga	atattgtaca	gaaatataca	gagagcagtg
66361	aggggctaag	aacctaattc	caaggtaact	acaaggaaaa	aattattgat	ctggattgtg
66421	accagaattc	aagagtttga	ctgtttgcat	tgttgctgtt	gttattaaagt	taaaaaaaat
66481	gagaaaaaaa	tatacttttt	tctagtatac	ttaccaggaa	aggaaagaga	gaaggagggg
66541	gggaaggagg	gagacatgga	gggggcagag	ggagagagag	acaaagacac	tgacaaagtc
66601	tggaaaaaga	cacaaattca	gattttaagt	cccaaaatat	gctacatttc	tgcccccttc
66661	aaaatatttaa	actttgctaa	aatacactgg	aaattttttt	tattgtttat	tttttaaatc
66721	aactagcaga	ccaattagcc	aagatgatat	tttcatcctt	ggtactcttt	caggtgagct
66781	ctgtgggcta	ccaccagaaa	gtcctagcca	accaagctct	cactgggtca	ctctgtgcta
66841	gctagactac	atagcctcct	aaaaaagcac	Rcagccctga	tgctggtcct	gccaaagtgt
66901	ggtttgctgt	catgtcctac	aggctaccCG	tttcccagtg	atttatcata	ataaaccaaa
66961	tgggaatgaa	ataccagaaa	atatgcata	aatctactag	tggTgaattt	tcaatatctt
67021	gcacaccatg	gtgatttggt	aattcagttg	gatctctatt	aaWcctctct	aaaatgtcat
67081	taaRccatct	gttttgactt	gttaatacaa	caacttttaa	aaatgtattt	agagtatcag
67141	taacccttga	attaatgcatt	ccatcagtaa	taatccccctc	tccaacttta	gatttatttt
67201	taagctctag	cttttttccc	caccattcca	acaaatagcc	tgacttccaa	aagtaagaa
67261	caatcacttc	agttgtagaa	atgtccagag	ggtgccttac	tttcgaaaca	ggaagtaact
67321	tgatccagca	gtcccacttc	ttgggtatata	tccaaaagaa	ctgaaatctg	gatcttaaa
67381	agatattttc	actgcagcat	atttgtaata	gctaagatac	agaggcaacc	taaagtgtcca
67441	tcaacagatg	aatggacaaa	ggaaatgtga	tatataYata	cacacacaca	cacacacaca
67501	cacacacaca	cacacacaca	cacacacaca	cacacatata	caatgaaata	ttattcagcc
67561	ctaaaaaagg	aaggaaatcc	tgTcatttac	aacaagtttg	atggaactgg	aggacatcat
67621	gctaagtTga	ataaaccaga	cacagaagga	caaatactgc	atgatctcac	ttacatgtat
67681	aatccaaaaat	agTcaaatcg	atggaaagcag	aaagtagaat	ggtagttgcc	agaggctggg
67741	ggaagatggg	aattggtaga	tgtggTcaag	ggttacaaag	ttttagtctt	gcaaaaTaag
67801	ttctggaaag	ctgctgtata	acataagtat	acaatcaaca	atactatatt	gtatacttag
67861	aaattttggt	aaagggtagc	tgTtatatta	agtTcctta	ccatgaaagg	aaaacaaaac
67921	aaaaaaaccc	aaaaagatgg	gaggaaactt	ttggaggcaa	tgaataagtt	tatggcattg
67981	attgtaatgg	tggttttagg	gtgtatacct	gtctccaaac	atcttgCaga	ataaacatat
68041	taaatactaaa	gtttccttgg	gaaagaagat	gagaaaaata	ttgtcaagag	actgtacacc
68101	aataaaaatag	tcaaggagta	caatgaaaac	ttaggaaatcc	catttcttcc	tttgactcac
68161	actgtttgat	gatatcattc	acatcggcatt	ttggaagtta	ttgagacatt	tcaacataag
68221	attgtcctta	tgatctatga	tttgggactc	tcttataaga	aagtccattc	tataccaatt
68281	tgttttgttc	cttggTaaact	agaccttctt	taattggatc	taagaatttaa	tattcctatc
68341	tcataaaagaa	gactaaaagg	atccaaagtag	atggagtttc	aaaggTggtc	ccataaaaag
68401	cattttttacc	ttaagcaaag	atgtcccaat	ttttcctgct	tgcttttcgg	atgctgttct
68461	aaaaaaaatg	taccttatct	cttctactaa	aagaaaacct	atcaattcat	tgattcattg
68521	aacaaatatt	tattgaacat	gtagtatgta	ctaaacactg	ggtaagattc	cagatatgca
68581	aagaggaata	agTccctgcc	cttaagaaaa	ctcacagtgt	ggtcaagcta	acaattctag
68641	agcaactgtg	tgataagggc	tccaaaagca	catgcaggaa	cacagagaga	ggcactctta
68701	gtcttgaggg	ggcttcctac	agtgggcaat	ttttgatgtg	tcacaaaagg	aggagctatt
68761	agggcacaag	aagagcaagg	gtgaagtTga	gaaaggagtg	aatagatggg	gaggggaccc
68821	aggcaaaag	aataacatca	gcaaaggTgc	aacttcatgg	gaacacagta	catttggaag
68881	cctgcccacc	atTgtttaca	gcagaatgca	tgtgtgggtg	gagatgaggc	tgCagagatg
68941	ggctggagag	gattatgaga	gatggatgac	tagcaaaagg	agttggTcat	gtccttatgt
69001	ggtggggggag	catggaagga	tttttatTTa	taagacgtgg	tttatTcttc	attctgtggc
69061	aaaaagcaga	tactatagtc	tgaatgtttg	tgtccctccc	cacattcata	tgCgatgaaa
69121	cctcatcacc	aatgtgatgg	tattaggagg	tggggccttt	gggagataat	taggtcatga
69181	gagcacagcc	cttataaagg	gattagtggc	ttataaagga	ggcccaagag	agctgccttg

```

69241 ccccttccac catgtgagga caaagccaga ggcactatct aYgacccagg aaatgagccc
69301 tcacaaaata ccaagtctac cgtgccttga ccttggacat tctagtctcc agaactgtga
69361 gaaataaatt tatgttgttt ataagccacc cagctcgtga tttattttatt tttttattta
69421 tttattttatt tttttattta ttttagagaga gagttttgct ctgtcactcg ggctggatttt
69481 cagtgccatg atctcagatc actgcaccct ctccctccca ggtgcaagtg attctagtgc
69541 cttagcctcc tgagttgctg ggattacagg tgcttgtgac cacatttggc tgattttttt
69601 gtatttttag tagagattag gtttcatcat gttgcccagg ctggtctgaa actcctgact
69661 tcaagtgatc tgcccacctc ggcctcccaa agtgctggga ttacaggcat gagccactgt
69721 gccctggctat gatattttgt tacagcagct tgaatggact aagacagaag gaaaaatagg
69781 cctttctgta gcgtgagctg aaagacagaa aatagccata ggtttctaaa gagagaaaaa
69841 gatatatgtt tgacaatatg tttcaattag tacttttttt gaaatgcagt aagttaccta
69901 tacctttatt cattttcta ctatatgatg gcattttaat attgactagg tttctgatac
69961 agtttttggg gtctgaatgt cactgcctgg atgaataaac caaacagatc ggatttcata
70021 gggtttgcca aatgacaaat ttttttccat gtaagattag agggaaaaact gatttcaccc
70081 aatttctctg cttatttata ttagaactga agtcaatgct gttatccctt tgcattgtct
70141 tttgtattta aaatctgata tagaattgtg ctgttacaga agaaataatt taatgcattc
70201 tgccctctta tttctcatga gttttcattt aaaagaaaac aaaaaagaaa aaggacattg
70261 acttttcttt atttctagac tttataaact ttttagttat caaataaaca catgtattaa
70321 ttaagtaggt aaaatattgc atatattaaa aggtacttgg agWctcatat gttgtcagtt
70381 tttcatgact caaaaattat gaaaaacat ctaagactat cgtaatgaag ttcaattgta
70441 gatcttgaag tgacaaaaca tgaaccacat tgacttgagg tccagggctt aaaactgcct
70501 atttgagctc taggttaaaa gcatgtgtga aatgcaaagt ctgacatctg cacagctgac
70561 tatgtggaag tctcagtatc attgttcata agtaaagctt gtccctaagc cataccacaa
70621 gcattccccg aggatataga tttcatYtga tttacatga ttgttgatat tggtagtgta
70681 tttcacgtga acttgtagaa tcatgttcta tacagacaat tgagacacta aaactttttt
70741 ttaagtattt tttgttaggg gctagatctg aggtttttta ttcatttgtt cttttgttca
70801 ctactttggt agttcagtta tttactcaaa aatgtatat gagcaattcc tatatggcag
70861 acacttgacg atgctggatt cagtgtgag caaagcattc gtggtttcta tgcacaagga
70921 tcctatcccg tggagtgtag agtcaagcaa agaatgtcaa caacaaatga aaattttaat
70981 ctattaatg ttatatgcaa aaatgtaaca cctccaaaaa agacaattta tttcctatta
71041 aggaatgaag gcagtccact gaggaagatc aacatgtaag cacatgtaaa gcaaaaataat
71101 caataggtaa tgtagttttt gaaaaagaa gggctttaag caggaaagtc tgggtttgga
71161 cttgggtttc aaatctagct atgtactctt gggccacata cccaagtctt gtaagtctca
71221 gtttccctct ttttaaagtt agcctaatac tacctcgctc atctaaggtt gtgagaatta
71281 ggtaaacagc caggtagctc atcaaattgt aattattata attgttattt tttgagtcac
71341 gaaagttttc acactgaagg gaacatttca acttgacctg gaagagtaag tagtttatca
71401 ggcagaaaga atttgttagg gtattccaga gagaaggaa aaaaatgtgca aattcaagta
71461 gtacagaatca aaatggtttc ttaaaggaa gaacaaacaga tcagtgcagt tggagcctaa
71521 agttatctaa ataatccgtt agacctttt ttaaactgat aaaaataaagc aagcatccca
71581 aaaaatcaat taaatccatc ttcctcctta tacctctcca tccccatac catggaaaca
71641 cagttttacc tcttttaca tgagttgtca gcatgaagag acttggttca ttaagattag
71701 caaacttcac agcattgaac aaaagataaa gaaaagttta tagcaaatat gttccatgtg
71761 aaagcatctc cagcaggttc agaagatgca atgaaaagac taaaacttga tatagggata
71821 tttcagtggt gctYgtacca gcgtcctaac attttgttct accttagtaa aatctatccc
71881 ttattactca tcctatctgt agactctctt atggaacaag aagctttttt tttttttccc
71941 ctaatcccg tgggaagccc tctccttccc tgggtgattc ctgagcaacc agggaaaacag
72001 cagtcacagt caacacagct agtacttgca gaaaatctct cttctgtgat gctctgaatg
72061 actcacagtt ccagatggcc ttgtcagcct ttatccgcat tccactcttg gcaccattaa
72121 cctgggtctaS tgtggttgca acaataaact tttcttgta tgaggaccag tgttttgaaa
72181 aatttaaaat gttataaaat taaaatgttt atatttgga attatttcca aataaaaaag
72241 gagcctgtct tcattataga ttatttggaa aaaatgcaga ggggtgcata agaaaaatgg
72301 aaacaagcca tctttttttt acccataaatt ctaccactca gagacaacta ctgtgaacat
72361 tttgatgtat ttatctccag tctttctaga aggtagatca ctgtaagaga tttctgaagc
72421 agaagtacta agtcagaagg aataaacatt tttatacctc ttaatgtgta ttgccaagata
72481 gtttttgaga aatattacag caatttctac ttttagaagt actgcttgag agtgatgtta
72541 catgggtattc tcaactaacac atatacaatg ttataaatat gtccaaaaat aaaacttagc
72601 aactatgtta tctccttgtt tcaatttgaa ctattacaa gagtgatcaa tttttaaatt
72661 taaatgttat ttttagcaaa gttatagatg caaatagttt agagaactaa gtagtaccac
72721 aaggattaaa aaaagagatc tcctgcagtg catccccac ccacaataca tacatgtatc
72781 ttcactctcc cagagggtag ccattttcaa atatttttag tgattcattt gctatactcc
72841 actctatctc taaatgatat aactttacag ttacttctta atagttcatt tttttgggca

```


72901	ttgcttattg	atacttcata	gcggaagata	aggatttacc	tttgcaacac	ttcacacttc
72961	tcatacccca	tccttctaata	atattatag	cttacttaga	ttgatagca	ttgtgtttcc
73021	atgagcagaa	ccaaagaaaa	actataagca	gctaaactat	gtaacatacc	ctgattacct
73081	ttttttcttt	gttttccttc	ttgaaaattc	ttgtcttttg	ttagtttctt	tgttccctta
73141	gatgtccata	tatacttata	actaattcaa	tcacaaactt	ttcccatatt	acaaaaatct
73201	aagtattggc	caaacacatc	agaattttta	ttaaattcat	cttcttgaag	aaatctcatc
73261	cagaggcctc	tttgacctgg	attggttatt	ctccatgtct	cttgctcagc	tgctactttg
73321	ggatgttctt	tccttattat	cccaagggtg	atgttttttag	agtttattcc	cttggttttg
73381	tgagcacgtt	ttccagtagc	ttcctgagtc	agtagcatc	agagatacat	tttttaagg
73441	ctgcacctc	agaaataatc	tttattccat	gctcactctt	gatcaatagt	ttggYtgagt
73501	atagaattct	tggttgagaa	tcactttcct	tcggaattta	aaaggcatca	cttcattctt
73561	ttctaggttt	caaaacgaat	cttcagaagt	ctgatgccct	tttgattttt	gatccttcta
73621	tacgatacga	taatgatcct	tagaacaagt	cacaagtctc	ttttttaata	ctttatatgg
73681	tgctaaatgc	ttcaattaat	gagttctgga	aatttttctt	caattttgtc	ctcctgcagt
73741	tttctctttt	ttctagaatt	tctgatttta	gatgttagat	ttcctgaact	ggctcctcga
73801	tttccacttt	tttcttctgt	attttctacc	tttttgtatt	tttgctccat	ttccatagag
73861	atgtctctca	tttacccttc	aaccttcta	ttgagttttt	aacttattct	atcatgtttt
73921	tactttccaa	gagctctttt	cctattctct	gagttgtttt	ttttttttcc	atagcatctg
73981	cttttggttc	gtggaagcaa	tgtaaatatt	tatgaatata	atatcaagtg	tatttcttct
74041	cctctctctg	atgataacct	cttctcgcaa	catctgtact	tttttatttc	tcttcttttt
74101	tttttttttt	ttttttgaga	tgaggtctca	ctctgtcacc	caggctggag	tgagtgggga
74161	ccatgttggc	tcactgcaac	ctccatctcc	tggtttcaag	caattctcct	gcctcagcct
74221	cctgagtagc	tggtgattaca	gttgccctact	accacgccca	gctaattttt	ttatattttt
74281	agtagagacg	gggtttcacc	atattggcca	ggctggctc	gaactcctga	cctaaggtaa
74341	ttccccccgc	ttggcctccc	gaagtgttgg	gattacaggc	gtgagccacc	gcgccccgcc
74401	aacatctgta	ctttgaagtt	ggctcttttc	catttggttt	ggtttctttc	acttactttt
74461	tctaagtatt	tgataaatct	tatctgtcta	ctcatattta	aggctagagt	actaaaaatc
74521	agattggaag	ctctgtttgc	aYaggttaaga	ttgtcaact	acatccactt	tttgatgatc
74581	caactgaaca	gtttcattca	gaaatacctt	gcaccattat	ctttgggttt	tttctcttgg
74641	gttggtggaat	tctccaaagg	ttatatcaat	ctcctgtcca	gaaggcttaa	gcatagttgg
74701	aagctgacta	ggggaagaag	gttgggactt	tcaaccttcg	gaattcattc	aacaaatatt
74761	tgagcatcta	tatttggcag	cctctattct	agccaccgga	gacacagtgg	taaacagaaat
74821	ttaaaaagcc	ttgtgttata	atgaacacaa	atatataagt	gtttatttaa	ttcctctgtt
74881	ttcagaatgg	cactcagttc	tcaacctgcc	taggcccccc	ttgtctaggg	acggttttac
74941	attcatcagg	aagtataccc	cttgtatact	tggttttcag	cttccaaaat	tttgttgctg
75001	ttatctccct	ttcccacttc	tttgtccttg	tcattttatgc	ctataaacat	ccattgatgg
75061	ttttctgaag	gcagaggagt	taaattggata	tgtaatttac	tatagatgta	atcagagggtc
75121	ttcatgttgt	ttttttgttt	tctgttttac	tattctaact	tggtcatttat	agatcttctt
75181	tgtagatagt	ctgaatttgt	ctttaatgat	taacattgta	aacagtattt	ttcctactta
75241	tttgcataag	ctctttcttt	gttagtgtat	tagccattgR	cctgcaatat	cttttaggat
75301	gaccgattct	gaagcctgct	gactgagttg	cttgtggttc	ctgtcattta	gaatgtatgc
75361	aggatcatgaa	tcgcttagat	ggaacagatg	gaatgaaact	tgctctaaat	attttaccaa
75421	aataaataca	tttaataaat	gtaaagaaaa	atcttcaatc	actaggcttt	gaacttataa
75481	cagaaaggta	tctgtcttta	actatattaa	ttcaacaaac	tttattgaac	agttggtaag
75541	tatgaagcat	catctctctg	agaacaaaaat	accaaggaac	tgagtcccat	ccttacagga
75601	ttctcaggag	taaatgggtc	aatacatagt	tataaaatga	tgagggtcga	tctatagcag
75661	aagtacaaaag	ctgagaacaa	ctcacttgac	ctgctaagct	ggggaattca	ggaagggttc
75721	agatctaaag	agcagacatt	tgaggtgggt	cttgaaatat	gagcacaatg	atgggtttac
75781	caggctgcaa	aggtgacaaa	gtgcattcca	ggctgataaa	agagggcag	caaaatattg
75841	caggtacaaa	aatgtgtatt	taagggaagaa	tgagaagttt	ctggaagttg	ctgaagatac
75901	agaaaaataa	gtggggggcg	ggggggggcg	gtgggtggag	atgaggagga	gatggtaggc
75961	ttgattcaaa	ttatggaaat	gtattttataa	tgaccaact	tgtaaagaca	ctgttgttcc
76021	ctaccacagca	gccactagaa	tttggttcagg	tgctaggcgg	ttgtgtcttc	aaggagatc
76081	aggccccctc	caggaccagg	atgaaccatg	attacttccc	agccaatttc	atagcatttc
76141	tcttgccaat	gaatggctta	gatataagca	tatgatgaat	ttgtttctaa	tacagatctg
76201	agaaagaaat	ctgttaagga	acttctgtgta	aagtttttat	ctttcttaaa	aagtgcagaa
76261	agaaaaggaa	gttgataaaa	tatacttaga	gctgctgtag	tcactctgag	accataagag
76321	gataaaaact	agatcaaaaa	ctactgtgct	gaggatgggt	gactagaaag	aaggaaagaa
76381	tctggattct	tgatgcatgt	ttgtactact	agaatcattc	tatcactacc	ttcttattat
76441	ataattcaat	aaatctctta	ttatttaagc	tattttaaat	gaagccttct	gttatatgca
76501	gcctaaacaa	atatactgat	tcaagctccc	agcaaatctt	gtcacacata	attcaaggaa

P A T E N T
Docket SEQ-4095-PV

76561	cgtttgttaa	taacttcata	ctatttatatg	gggaataaat	gattagtcaa	gaaagacttt
76621	ctgtttttgaa	aaatttctgga	aagatgataa	tacagtatgt	agattttattg	tcatggctaa
76681	tatacatcta	catataacat	gaattacctt	ggagttagtaa	taaaagggca	gagtaataac
76741	ttgtgcagag	ccctagacta	gaaaagttga	aaatataaaa	tggaggaaaa	agttagttat
76801	gagattcagt	aatatgaaag	tataagaaat	aaaagaatcc	aaaagccata	gaaggttgaa
76861	actgaaaaga	attttagaaa	gcgtctaggc	caggtgtggt	ggctcacacc	tgtaatccta
76921	gcactttggg	aggccgaggc	aggcagattg	cttgaggcca	ggagttccag	accagcctgg
76981	ccaacatggt	gaaacctcat	ctctactaaa	atacgaaaac	ataactaggc	gtggtggtgc
77041	atgccctgtaa	tcccagctac	ttagggtggct	gaggtggaag	gattgcttca	acctagggag
77101	gcagagggtg	tagtgagcca	agatcgtagc	acttcattcc	agcctgggtg	acagagttag
77161	acactgtttc	aaaaaataaa	aagagagtct	agcctaaacc	ccttaattat	acagattgaa
77221	aaccagtcct	ggagaaattg	gaagtcctca	aagagtttac	cattaatggt	ggaaccagga
77281	cttcacacaca	atgttctgac	ttcctttaga	gcacttttta	ttatatcata	tagttcctta
77341	cttctcacta	ttaatagaga	ttattttact	aagagtaagt	ataataagag	ctgatacagaa
77401	gacctgagag	acataatgga	gtttcaattc	taatttgctg	ttggctcctt	gaaatgcttt
77461	gttgagaagg	agtaaaaaagc	ttacaaaaca	cacacacaca	cacacacaca	cacacacaca
77521	cacacacaca	cacacaattt	cttaattatg	tctaccatgg	gcatgggatg	gtaggaaatgc
77581	catgtaacta	gtttccatgg	atggaaacca	cctaattggga	aatagagaaa	aagaaaaaga
77641	aaagaaattg	tgtgtaaatt	ttcagctcat	tttggttag	attacatgat	gaaacttatt
77701	tctttgaaaa	actcatittga	ttttgaatta	gatttatatg	aacttctctc	ttgtcaattt
77761	taatttcttg	tcttgtttta	gtttgctttt	ctgagcagta	gatatacctc	caattggaga
77821	ttccgcaaaa	ttagtactta	gtcatcttgg	ttcctttcaa	gtagaaaagt	ttccttttaa
77881	tacttcaaat	catttgtatg	cacatttgtt	gcaaaaaaaa	acctcattct	ggaaaatgtt
77941	gcttatttta	ttatccaaaa	aatagggtatt	tattaatata	ctgcatttct	tttaataaaa
78001	ataaattaca	gattttcttc	cagcatccac	ttatttggaa	ttgggtacat	atgaagaaaa
78061	gacttcttat	aatatggaat	tatttcaaaa	gctattatta	cttcttataa	atataaagca
78121	tacaagaaat	tctcaccatt	ttctaagatt	tacattagaa	agatataagt	attgtctttt
78181	agaattactgt	ttttattttt	ctaaatattc	cttataactt	acttattaat	tttatccttt
78241	ctttgttata	aatatccatt	ttttttaaag	acccatacta	tcttttctta	tgcaatttaa
78301	cctaacatat	tttctgtaaa	tgaggttatt	tagttatcca	tttttctacc	tcctgtgtgt
78361	tggcagtcct	caaaaccatt	gcagatcttt	ctagagagca	gtttttaaga	acagtgcctt
78421	acttttcaac	tcttgatcaa	cctgatgaga	attcctttgaa	taaaccagaa	ggaaggctaa
78481	agagacaaaa	gaatactata	gtttccttaa	agttaatgag	ccagaatcct	ttggccact
78541	ttggcattga	acaatgtgaa	taaaatggcc	actctccat	cagtaattta	cattttatac
78601	agtgtgtact	ttacactgat	atttacaag	aggaaaaaca	acagtttttt	acatgtaaga
78661	ggagctcctt	ggcagataaa	agaaaaactt	actcccatta	gtacaacact	ggagtttaaa
78721	tctagagaac	aagtacttca	gaacctagta	gaaaaagtcc	ctgattttgta	ctttgtatga
78781	acaattagg	ttgagaatat	tgctatatata	tcacagaaaa	tactggctat	tatactactg
78841	gaagtcttca	gtgacaaaga	gagaaacaga	aaaaatagtt	aatgccataa	caatgaaat
78901	gtggaatgtg	aggaacgccc	agtgaccgta	aatatctacc	ttaataagcc	tgacaatttg
78961	tatacagttc	atgcaattaa	caagtgtgat	aaatatgatt	attactctca	agttgaaatc
79021	aattttcttg	gctaaaagca	aagaattgtt	attgagcaga	tgggattact	tttctttgcc
79081	aattttatctt	cataaaaactc	aatcaatgcc	ttgccttaaa	aatgtcaaat	aactcagatt
79141	tcaggataac	acatacaaac	taatctcttc	tgctgtcttc	tacctgatca	ctccctactt
79201	caaaagctcc	aacaacatag	tataactgac	acaaatcaaa	gcaaaaacta	tttttctcac
79261	tgctacatgg	tcttatcaat	aatccagtat	ttcaatatct	aataaaaagt	accacaattc
79321	aaagcagtaa	tgtgcccaaa	gctaccgatc	cacaacatat	atattgatata	ctaaaaatat
79381	atggatataa	cttgttatct	actaaataag	tttctttgca	gtgtggtggt	aatagccaga
79441	attttaaata	cataaaaact	tgggttcaaa	tcctaaactct	gccacttaaa	tgctatatga
79501	caattgggtca	agttacttaa	cctctctctg	gtctcaagtt	tcttgtctgt	aaagctgtaa
79561	tagcttttag	agtgctcttc	tgaatattaa	aaaggcatta	tactcttagc	ataatgtcta
79621	catagagtaa	atatttaaca	acaaaataac	aaatattagg	tgtgttattg	gagaattgga
79681	gttttaaata	aaggagttgt	ccctaaggta	cattcaattt	aactatgata	tttaaaactt
79741	caatttttca	cattattttt	ccaggaaaat	atttcaactc	tatttctcca	taatttggtt
79801	tgaattgtaa	aagagatttg	caagcggctg	aagcagttac	actatactgt	atatctgcag
79861	gatgggcaac	tgattttttt	tttcttcttt	tttttttttt	tttgagacag	agtctcactc
79921	tgttgccag	actggagtg	agtgggtgca	tctcgctgca	acctctgcct	ctcaggttct
79981	agggattctc	tgcatcagcc	ccctgagtag	ctgggactgc	aggcacacgc	caccacgctc
80041	ggctaatttt	tgtattgatt	ttcaagattt	gtcaagagct	cctaataattt	tcttttctca
80101	aacacatctt	aggactacca	tgcatatcag	tcagtcagct	actctggagg	tctgctgcaa
80161	ggatacacac	cttccattcc	cacccatcag	atacttgtct	cctttctccc	ccactccaag

80221	acagcaacct	tccagctcta	gataaaaaaga	gctagtcttt	cttgcataag	aacaacaaag
80281	acaaaaacca	ttttggtagt	gtataactgca	gattttaacc	aaaacttctc	tgaagacctc
80341	tgatttccta	aaaaacctct	tcattcccagt	gcagttgctc	tttctctaat	gagcaaccgc
80401	gcattctggtc	aaatttgggtg	aatattctgt	gctccagaaa	caactgattc	catccccctt
80461	aatctcttct	tctcttatat	ccattctccct	ccttggtgtt	tctctccatg	tttacaacta
80521	gttcattgat	ttaaaaacca	atgtaataca	caaggaagta	tgacagacaa	tgtttagtgt
80581	agtatgggtt	gcaatattaa	aaaaggccat	cagtaagaaa	atagttaaag	gataaacttg
80641	atatacatat	tatgctgcaa	tttaagaaaa	ctggtataga	tttatacgta	ctaaaataaa
80701	ataatctcca	aaacatagta	agtgcacaa	tcaatcacar	aataacatct	gtagtatatc
80761	acttttgatt	tttaaaaaat	accctaatt	ctaaatgttc	atataataaa	atattcagtt
80821	aaaaattctg	aaaagatact	gctatgggtt	gaatgtttgt	tccatccaaa	actcaggctg
80881	aagtttaatt	gccattgtta	cagtatttaag	aggtaggact	cttttttttt	tttttttggt
80941	gacagggtct	cacttcaaca	cccagggttag	agtgcagtg	catgatcata	gctcactgtg
81001	gcctcagctt	cccaagctca	ggtgattctc	ccacctcagc	ttccagagta	gctggaaact
81061	caggcacatg	ccaccatgcc	cagctatttt	gttgattttt	tttgatttga	taggggttct
81121	tcatgttgct	caggcagggt	ggtctcgaac	tccttacctc	aagtgatcca	cccacctcag
81181	cctcccaaag	tgctgagatt	acagggttga	gccaccacat	ccagcaagag	ttgggacttc
81241	taagagggtg	taggtcatgt	gagctttgcc	ctgatgtaag	ggttaatcct	gttatcactg
81301	gagcagggtt	gttataaaa	agtgcagcgt	ttggtccctc	ttcctctctc	tctcccaatc
81361	tgtctatctc	tctccctttt	gctttctgcc	atgtggtgat	gcaacaaaag	gaccttaaac
81421	agatgccagc	accttgattt	tagattttcc	agcctccaga	actgtgagcc	aataaatttc
81481	agctcatgat	aaattaccta	gtctcaagta	ttctgttaga	gcagcacaaa	atggattaag
81541	gcagatatac	accatattgt	atccatcact	aagtggatac	tttcaagaaa	gacagcaaga
81601	ctaaggagga	tgaaaaagga	ctttctcata	ttctgaattt	taaaaaatatt	ttatgacatg
81661	aatatattta	tctattacct	atgtaataaa	actagacatt	aagagaaaaa	tctcatggta
81721	gaaatcttag	gaaatagaga	aaaattagag	aaaattaaga	aaaagcatgc	ataatttcac
81781	aaaccaatgg	tagccactgt	aaaaaaatgt	tatttcattc	taatacattt	ctacacacat
81841	atgtaacagc	tgcatttttg	aaaacataac	tgagtctttt	ctaattgacc	tcttactcta
81901	caaaatttga	aatagccaaa	acaaattttt	gatttcctata	aagagatagc	actagagctg
81961	gaagagatgg	ctcatgcctg	taatccctac	actttgcatg	actgaggcca	gagaattgct
82021	tgaggccagg	agtttgagac	cagcctgggc	aacatagcag	gacctatctc	tacaaaatta
82081	ataataataa	taataataat	aataagctgg	gcataatggt	gtgtgcctat	tgctcttgct
82141	accagagggc	tgaggcagga	ggactggttg	agcctggaa	gttcaaggct	gcagtaagct
82201	atgattgcat	tacactctac	ccagtgtcaa	ggaaaggaaa	ggaaaggagg	ggagaggagg
82261	ggagaggaga	ggagaggaga	ggagaggaga	ggagaagggg	aatgggcagg	ggcaggggga
82321	aggcaaggaa	aggggcaggg	gcagaggcaa	gggaagggga	aagggcacta	ggacctatga
82381	gccaacatag	gctatggctt	ccactagtac	aacttaaaac	tcagctgaag	acatgacaca
82441	tagaaaaggg	ttgctgtgtc	tgtaacacaca	cacgtttccc	atgttcccaa	tcccagctctg
82501	tggtcagtag	aagtgaagat	tgctcagag	cctgcattat	ctcaagctac	tgacctaat
82561	gctaattgctt	tactctggYc	tatttcctgc	Mtgacctcag	aatgtgtcag	tgtaatttcc
82621	atagtaagac	agtagttgca	cattttggag	tggtgattct	gctttgaaac	acaaataagt
82681	gtgatgaacg	tgacctgggc	actctgtagc	cctcagtttc	ctcaacgcta	aattgatcac
82741	tacagttcct	tctagtgtaa	acagtcccac	gaagaatcgt	gctgaatgga	tgactacata
82801	atggcctgct	cctagagttc	ttaaatcaat	ccttaaaact	ggctgcaaaa	tgacttcact
82861	cctttaacag	tggtggactt	gtctctgttc	tccagaatgc	tcaccagatg	gtgaagaagt
82921	atctctctac	ctaccaacat	cgctcatattg	cttcttgcca	ctcgtactc	aaaaaYtggt
82981	aaaaacctgt	gggagcaagt	atcagctgaa	aagggtggct	ttctccttag	gcaaaagctR
83041	caggggcaaaa	cgggggcccc	aaacttctat	cacgtcaaag	acatgaaaca	gatgatccct
83101	agttttgatc	ttctttgaag	tttattaaaa	acaagcttga	atctgtacca	atcctgacag
83161	gtgtgaatgt	aagactcaca	aatgagaaat	gctaagcttt	cctaattgtt	aatttaattc
83221	tatagaccat	gaaacatggt	ataattaaag	atctgaacta	ttaatatgaa	ggagatagca
83281	tatatcttta	ccccaaatat	gactaactag	gtaaaatctt	caaaatataa	tcatggcctg
83341	attatcagcc	attgtggagg	agaattttta	aaagtcttct	attgacatcc	caagtttatg
83401	ttttagacac	ttctaataca	acatgaatag	atctaacttca	agtaaaaatt	aatagtcaca
83461	ttattgatta	tcatgattgg	aaatgtattt	gaccagaaca	atgaggaaag	agcatagagt
83521	cctgctatct	tcaagtatga	atttacactt	ttactgatg	tcaagtcatc	catagtatga
83581	aaactcattt	atttttattt	gaaaaattta	aaaccatcaa	aatggatagt	gtgggagcca
83641	ataataatat	aagcaatatt	ttatgagaac	tacaaaacta	ttaagagcag	taactagaat
83701	tcggttactg	ccgttcctta	tttcagaaga	gaaagtcaaa	tgttttctga	tatttaagaa
83761	gtaataaact	cctgttggtc	agttatgctt	tctataatta	tatatgataa	gcaacagaaa
83821	aataggctcg	gttttggtcg	taatgtgtat	attcaattca	atattaattt	ggactttaaa

83881	tcatttttgc	atcaaatatt	ttgaacctca	tgaccaggaa	gtaatcaggt	aaaaaaaaa
83941	aagaaaaaaa	gtgggtttgt	tacctgacct	atctcttaag	ttcaaacttt	ctataggtat
84001	ttttctctac	ctttgtccat	atgggtatac	aattatcact	agatgcttga	attactaaat
84061	ggttttgtat	atcttttcct	caaatttata	tttgtccctat	tattggctta	gtctctcaaa
84121	gtattacttt	tatgatattg	ctataattgt	cctctatagt	ataaagttag	gcccacacca
84181	tttatccctgc	cacttaacaa	tgctcttaat	gtagattata	tggtttggcc	atgccctaac
84241	caaaatctca	tcttgaattg	taatccccat	aatccccatg	tggtgcggga	gggactgggt
84301	gaagataatt	gaatcatagg	gcagtttccc	ccatgctgtt	ctcatgataa	tgaatgagtt
84361	tcacaagatc	tgatggttat	ataagcttct	ggaattttcc	ctgctgggtg	ttactctctc
84421	ctgctgccct	gtaaaggagg	gcattctgcc	atgattataa	gtttcctgag	gtctcccag
84481	ccatgcagaa	ctgtgagtca	attaaacctc	ttttctttat	aaattaccca	gtctagggtta
84541	tttcttcaca	gcagcatgag	aatggcctaa	tacagtagta	tatcacactt	attaaagagt
84601	tgatagtaaa	atagcactct	cagtacaata	agaatagaat	agttcctttt	catggtaatg
84661	aatagctttt	cttcgacatc	tataattaac	aatgaaatca	gaaacaaaaa	gaagctgtct
84721	ccactattac	tgaatggtgc	tcagaaaatt	ctaacgtaag	caaccaaaca	agaaaaccaa
84781	atatgctgta	caaatatttt	taagagagaa	ggaaatcatt	ctatttttaag	ataaaaaatc
84841	tgtaactcaa	aattcaggag	aatcaactga	aagggtataaa	aaaggtagac	cattatgatt
84901	tataagaaag	gtcaaacatt	ataaagcatg	tatccacaac	agggtttttt	ctatatacca
84961	gttagaaaaa	agataaatga	tcctattcat	aatagtaata	aaacatatca	aatatgtata
85021	aataaacaac	gaaaaatgta	aaactcttgt	ataaatatta	ttgcaaaaca	tcactgaagg
85081	acatttttta	aaacttgaag	aatatatcta	gtttcctaca	tggaagagt	caatatata
85141	aagatatcaa	gtcttagatt	aatctatgag	ttaaatgcag	ttacttttgc	cctaaaaatg
85201	taaaaggctc	ttaattatgc	aattcgaagt	gtgatgtcta	ctttcttctt	gaaagcattt
85261	ttcctggaac	cttctgatga	ctctaactta	ggctgcctgc	tttctaggcc	tactactaca
85321	cagttgtcat	actgggattt	attttcataa	acatctgggt	tggttccaat	gctcttgta
85381	tcttaggttt	tctgtatagg	attcccgttg	ctttgttttg	cttgaatata	tcttcgagta
85441	atacttcctt	ttaattagga	agaatctgta	ggaggtaaag	ttgtaaactt	gagtccttcc
85501	atgttttaaa	acatcttttag	tttgtcttaa	cacttgatag	tttgactatc	aattttgggt
85561	tctagttctt	cttcctgaga	actttgaaac	cttgccctagt	ctgcattcac	ttctaattct
85621	gctgatgaga	agtttgatac	ctttgaaaga	tccttttttt	ttgttctctg	gaaggattaa
85681	tttcttatac	ttagaattcc	aaaattttca	tcagcatgtg	tatacacatc	tagatatgta
85741	tccttttttc	cttgttcggt	gttggtgaa	acttttcaat	ctgaggactt	gaattactct
85801	tcagggtcaag	gatttttttt	ctgttatatt	cccacatcct	ttcccattcc	tccacttcta
85861	ccacattctt	catatctttt	ttacttttcc	atcRtatttt	atatccttgg	ctttttgctc
85921	tatatcttaa	gatatttgct	taattcaata	ttcaagaatg	aatattactt	gaattgcatt
85981	ttatccaatc	tttatatata	catatatatt	cagtattctN	ctattttatg	aaatcagatc
86041	atacttaatg	gttatattct	ccccctgaat	atctctgaaa	atttaatat	gacaaatttt
86101	tcccacactt	ttcattgtct	ctgtttcttc	tggaagcag	aagataaatt	gtctcaggaa
86161	aataaatttg	tcctgtttat	ttattagttc	ctttttgttt	aggctactgg	ttttttgttt
86221	tggtttgggt	ttttgtcttt	tttcaaatgt	ctgggtgatcc	tttcttgact	gggaattatt
86281	gtaatttaag	aactaggagt	ttcttaagta	gttggcaggg	atatcataag	gagctctgta
86341	gtacttataa	actgcttata	agcaacttaa	tgcaatttca	atcaaaatct	taatgggttt
86401	ttttgggggg	gacttgacaa	gtagattggt	tgtataattt	agcacaacga	tgtgagaata
86461	acccaggaaa	ttctaaaaaa	taagattaa	agggaatatg	ttctcccaga	tattaaaatg
86521	tatttcttaa	aatccataat	aattataaca	tggggctttt	tgtctagaaa	taggatgtaa
86581	agattaaaaa	aggaactaac	cataaacagt	agaagtggca	tttcaaggca	ataaggaaat
86641	aatagattat	gtaataccta	ggattctgac	aatttagaaa	atctaggaaa	agaacatcag
86701	agccctgaaa	taaagtaaaa	taaattccat	aattattaga	gatataaata	tatgatgtaa
86761	aatgattaaa	tactagaaga	aaatattggt	gttggaagag	aatgtgtaag	gatttataaa
86821	atatatttat	atagagacta	tataaacat	ataaacatac	aggctacata	gggactattt
86881	aaacttctat	ttattaaaa	agagtatctg	taaaagttaa	aatagaaatg	aataaatggc
86941	aaaaaaNtgt	aaaaaacaaa	cataaatgaa	aagttaatat	tcttaattct	taaagaacac
87001	tctaaaaatca	ataagaggcc	aggggtgggt	gctcacacct	gtaatcccag	cacttcgaga
87061	ggcagaggca	gtcagatcac	ttgagtcag	gagtttgaga	ccagcctggg	caacaaagtg
87121	agacacctgt	ctcctaaaaa	ataaaataaa	ataaaatcaa	caagaaaaaa	caaatcagcc
87181	cacgaataaa	taataaaaata	ataaaaagca	aatatgtata	attgccatta	gacacacaaa
87241	acagatttta	atattcttga	agctaaatta	attcttatta	aaacaaaata	ctatgtgatt
87301	catcaaataa	agagaacaat	taaaatgata	aaatatagca	acggaaataa	tgtagaataa
87361	gagactgctg	atgaagtata	tataaacttt	ctgcagggca	atatgacaat	aatagcaaaa
87421	ataaatcttt	aaaatattgg	gcaattcttt	agtttgacaa	ttctaattct	agaaatatat
87481	agtaagaaaa	caaccagcc	ttgctataaa	gactctacac	aaagatattc	atcacaaatag

87541	tgcttataat	gtgaaatctg	gggagagctt	caaatattta	ataatagaaa	attgcttaag
87601	tgtagtata	tcattgtaag	aaatgccatt	aaaatgttat	atagagaatt	gtatttaag
87661	gtaagaaa	tggttcattg	gcaatatact	gtgaaatttt	aaaagcagat	tataaaatat
87721	taccttcagt	ataatctcat	tggtgttagt	aaaactcctt	ctctctctac	atacacactc
87781	tcacacacag	agacagaaaa	attatctctc	aatggcataa	ttattgacag	ttcgttttct
87841	cccccttgct	tattattatt	ttgtaataga	tatgctatag	ccactcaata	aatatttggt
87901	actaatttca	aaaagtatgt	attattatat	ccagggttgt	catggaattt	atcatgcaaa
87961	caactaccct	cttgagagag	tcaaaagtgg	acactataaa	ttatgaattc	atataaacta
88021	tatcaggaca	atgggcataa	actgagtgct	ccaggcacgg	caaatgtgct	ggataccctg
88081	gagatgtatc	ttgactttta	gaagtttaca	atctttcttg	gggtagaag	attaaaaaac
88141	atgaaccat	tagaaataat	ctccacaat	tagttttgta	aaagcaagt	cttaattgta
88201	cttgacaaac	attagatggt	actggagggt	taagaagtaa	gagctgaata	ctcgtagaaa
88261	aagctccctg	gaggaagtgg	ggactgagtg	atacttttag	aataggtaag	aaaaagaata
88321	atgagaactt	ttcaaatgga	gggtgggggt	gtagaaggaa	aagaatcaag	tattcagagg
88381	tagctgataa	cgatgttgta	tataaaaaat	cacctgact	tttgcaagg	gtccgtctat
88441	acagaagagt	aaaaagtaaa	caatctatta	acaatgtact	atcactgcct	ccactttaca
88501	caggagaaaa	tcgaggtttt	agaaggttac	ataacctgcc	aagggtcaca	tagctaaaag
88561	tggagagctg	agatttgaac	ctaaggagtt	gggttcagag	tctatgcttt	ccaccctatg
88621	ctgtactgcc	cactacagtc	aagctctggc	ttcttgtata	aatctgatgt	cactctttgt
88681	gggactgctt	ataacatttc	ctcaccaga	atccatacct	cctcctttct	gctctgtcag
88741	agctctttgt	ctattcacac	acagttcaaa	gaataccttc	tccatcaaat	ttttctaaca
88801	attccaatct	tggaaattct	tcctaccttg	gagttgagaa	caccactctc	ctaaatttct
88861	gcctacttct	cagccactac	ttctcaatct	ctttgttgga	ttcttctttc	tctatatttt
88921	tSttttttta	gtctactcat	tgctgtgtg	agtaccttca	ccccaaaaac	tacaatacct
88981	acctaccatt	gtgctgaaaa	ccccagctta	cattgctctt	ccacattcca	taaatttcta
89041	tctggatgtg	cacagacacc	tcaaacttca	tatttccaat	actggcattt	acctatctg
89101	cagtttttac	tatcttatgg	acagcagatg	ccagaaatct	aatcactgaa	accagaaacc
89161	catgtacaat	tcttgagtcc	tcctctcttc	aagcctaaaa	tcctggaagt	caccaagttc
89221	tgtctatttt	actctataaa	taactattag	attcttcttt	catctgaact	cccttagttc
89281	aagccctctt	tgttttctcat	atgattattg	tagtaggctc	tgaactgggt	ttcctggtag
89341	ctgtcttttc	cctgcctact	ccaattctac	ctccacatca	acattttctc	aatttgaggg
89401	gtcatagact	tccaaggaca	ttccacaat	ccctgagaag	tatacagttt	ccatatgaga
89461	aatcactgta	gctaaaaagt	aaatactttt	cttcagttga	ttatgtatag	ctaaggcaat
89521	aattcaagca	ttagtaaaata	caaagccaaa	atgcaggcac	attacgcaga	aatgcctgtg
89581	tcttgggttt	ttaaaaataa	cgtaaaaaaa	ataaggccag	atgtggtgac	tcccactctg
89641	catcccagca	ctttggggagg	cYgaggtggg	atgattgctt	gagaccagga	gttcagagacc
89701	agccaagaaa	acatagggag	accttgctct	tacaaaaatt	tttaaaaaatt	agccaggcac
89761	agtgtgtcgt	gcttatagtc	ccagctactt	gggagggtga	ggcaggagga	tcgtttgagc
89821	ctgggagggt	aaggctgcaa	tgagccactga	ttgccactgc	tctccagcct	gggtgacaga
89881	gcaagaccct	atctcaataa	ataaaataaga	ccacaaagga	aaaaaattct	tacagagaat
89941	tattgaagta	taaattgtgt	caaaattgaa	gaatataata	aaccctaaga	ttaatagtcc
90001	tgtccttgag	aaagatcatc	aagtgtgccc	cccatgcttt	aaaaaatatt	ccaagctttt
90061	tagcataata	tctaaccatt	cttagcagtt	cctaataagt	tacttctctg	tagttacctc
90121	tctcactcct	tccccatcac	ctatagtgcc	acaatctgta	acctgtttga	ggctctctca
90181	cacctttcat	actgcaatat	ttgctcgaa	tattgacccc	caaccttact	catctttcct
90241	ttctaactaa	ctaacttctc	ctcatctcca	aagccccagc	tcaagaattt	tcattttctg
90301	aagaatctct	gattttcttc	tcttctctag	tcttgaaatg	gtatgtgtga	accacagctc
90361	tggtgtaatg	tcattgtcct	ttctgtttta	cacctcag	tgctggctct	tgaagtctgg
90421	gactgtctta	atctacttta	aagtcttcaa	gccaagtaca	attcctaggc	atgcaataca
90481	tgtttggtta	atagatggat	gacctttatt	tatatatttc	tttccctttt	ctgctacaa
90541	tagttaactc	attcatcttc	tcatctacta	ataaccactt	atctgtttat	ttctgggaat
90601	acaaaaattc	ataaaacatc	atccttgctt	ccaaaaaaca	ctttattatt	gtgccatcct
90661	tctctctctt	tctctttctc	tccttctcta	attatctagt	tgtgtaggta	ttttcttcaa
90721	aggaataaca	ggtactcaga	ggaacactta	tacactgttg	atgggagtgt	aaattggttc
90781	aaccattgtg	gaagacagtg	tggaattccc	tcaaagacct	aaaaacagaa	ctagcattca
90841	accagcaaat	ctcatttctg	ggtatatgcc	caaaggaata	taaatcattc	tattataaag
90901	acacatgcac	gtgtatgttc	attacagcag	cattaacaat	agcaaaagca	tagaatcaac
90961	ctaaaatgcc	aacagtagta	gacaggataa	agcaaatgtg	gtacataaac	accatggaa
91021	actatgaagc	cataaaaaag	aatgagatag	tgtcctttcc	aggaacactg	atggagctgg
91081	aggccaatat	ccttagcaaa	ctaacacagg	aactgcatgt	tctcacttgt	aagtgggagc
91141	taaatgatga	caactcatgg	acacatagag	ggaacaaca	gacactgtga	cctatcagag

91201	gggtggagggt	gggaggagtg	agaggatcag	gaaaatcaac	taatgggtat	taggtgtaat
91261	atgtgggtga	tgaaataatc	tgtactacaa	accccatgac	acaagtttac	ctatgtaaca
91321	aactctgtaca	tgtaccctcg	aacttaaaag	ttaaaaagaa	ataaaaaata	aacagaatag
91381	tagggattca	ttacaatatc	ttctctcctc	ctcataattc	ttaaacctgt	gtagaagttc
91441	aatacatatt	tgtggaatag	ccttattacg	cctttaggga	atggagcaat	gccttgccata
91501	ttaatctata	cttctatcag	agtttcctgc	tgtatggaaa	acctgagtg	tacacttcaa
91561	acaaatgagg	caattttatac	atttttgttg	ttgttgttgt	tggtgttttt	ggcataaatg
91621	tgctaagtga	gctggagttt	cagaagagaa	actgaatgtt	atatgtgaat	ccagggtcagt
91681	agcttggctc	tgactacaat	actgatttca	ttcaagataa	ggaaactaat	tggtatcaat
91741	tttagttgac	attatatgtt	agttttataa	tattcaggaa	tttttgaagg	attatttgat
91801	ttttattttt	atagatgttc	ttgctcttta	acactaaata	atgaggaaag	ataatagggc
91861	taacatttat	taagcattta	tgttggacag	gcactgcttt	aagtattttt	atatgtatca
91921	actcattgaa	ttttcacaa	tcttagatct	atgtgatagc	tggggaaact	gaggcacaga
91981	gaacctcaag	taacttgccc	aaggtaagcc	agctagttag	catggaccag	tgattcaaaa
92041	acagggcagtc	tgtactcctt	acaactgtat	tatgctgcct	ataaaaaggac	cactagacta
92101	ataattatga	aaccagattt	ttaatcttaa	attagccata	taatagtaga	gtgcatttaa
92161	ggatgtcatc	tgagtttcat	tgctccttga	ccccttacag	cctgtgagaa	ggaaccttta
92221	tatagtcttt	cataaactgt	aaagtgttat	aaattcaaag	atctcttata	atatgtttaa
92281	attactttta	agagttgaga	agtccaaata	aaagcagaga	gatgagagga	aacactagca
92341	ctaaatgttc	agacacccac	tgaccaYgtc	aagctgcaca	ttttgttgct	aaacctaaag
92401	gagagattag	atatgaggag	agtgggaagc	aagaaggat	gaagtctggg	tatttaggga
92461	ctaatagaaa	tgattttctc	gattagttta	agaacattag	caattactta	cgggataaag
92521	acagttaaag	gaatttctcg	aaggataaaa	actataaaaa	ttagtcaaat	tgttaaaaata
92581	tcagaactgt	gtaaaagcat	ataaagtttc	atcatactct	tcttttgaaa	aacaaacaaa
92641	cacttcatgt	tctagccagt	tgctaatagt	gatcagttga	tgaatacacc	tcatgtttca
92701	cgcatataaa	attttacacc	atgtctagtc	cataggcatt	agtgtaggag	tcagaataca
92761	acctgaattc	tgttcgcagc	tttgtgcctt	gtcgataaag	cagtggacat	ctctccacag
92821	ggagatattg	ttcctcccg	gatataaggg	atgttgattc	acttgtctcc	tctctatttc
92881	gaaaagatgc	tctgaagatt	agtgagacaa	tggtgtgtaa	gctccttgca	ctgtttacaa
92941	cataaatcat	acacagacat	actggcatga	gaaacgcctat	catcatctct	tttatacatg
93001	agaacaacca	taaggaaaac	aaacctcaga	gacagtcctg	tattataaaa	atgttgggta
93061	agagtgccaa	aagttgtagg	gtaggaaaaca	gcaacaacaa	caacaagacg	gaatccaaag
93121	aatatttgca	ttctataata	tattctacag	agtYtcagac	gggaccttcg	ttgagtgtct
93181	ccaagtatta	tcagtagcca	tgtttttttt	ttctttttct	tttttttttt	tttttttttg
93241	gtaaaaggga	taaatagtga	tgtcaggaga	tgctgcaaaa	tatatccag	tgataagcat
93301	atttgatgga	attaatggat	gaattcgcct	ctcttattgc	catgttggtg	caaatactct
93361	aacttatttg	gcctttggct	ccctaaaggg	tgctcagaaa	tgctgtttag	aaagtacttt
93421	tcattgaagag	ctacaacaac	aacaaaaaca	aatacaattc	aaatatctac	taaacatatg
93481	aaggagtact	cactctcatt	agtaatcaga	gaaatgcaat	gatcccatta	tagagccctg
93541	tcatttgaaa	aaaaagaaa	aaaatccaa	tgttttttat	tagaacgtgg	agcaacagga
93601	attctcatta	ccttctcaac	cactttgtca	aatgctttct	gcttatctgc	tgaagttaaa
93661	gatatgcatg	acccatgaat	ccactcctag	gtatatctcc	ccacaaaaat	gtacgcttat
93721	gtgcatcaag	atacacgcac	ataagtgttc	gaaatatctt	tattcataat	atttccaaac
93781	tggtatgttt	caactgcata	aagaaagaag	attggacagt	aaattgtggt	tcctttatac
93841	aacagaatgc	tatatatcat	gatatatatt	atgatgtgca	atcctcagct	acatacaaca
93901	ttgatgaatt	ttacaactat	aatattgcac	aaaaggagca	aaacacagga	gtatctacaa
93961	gatgagtcca	tttacataaa	atgcataaaa	aactaaattg	aactgttggt	ttggcatgca
94021	tacatacgtg	gtaaatcata	aagaaaagta	ggaaaagtaa	aagttaaagtc	aagatagtgg
94081	tgacctatct	ggagaggatg	aaacaggaaa	ttatagggtc	tttctgaggg	gtgatcatag
94141	taggtattta	ctttagaaca	atttgtttaa	cttaaaattt	aaattttaca	tactttctta
94201	aattttgtta	tatttcacaa	tttaaaaatt	tataaaatga	taattttaca	aagcctaaaa
94261	gatgaattat	ttgggggctt	ttacttctct	ttcatctgta	caactgctga	tgaaaatcac
94321	caggtgtgta	taacatgaag	catctcctta	aatgacatgc	atattattggg	aaaaaacaca
94381	aagtcacaa	ggtaaaatgt	tagcaaggtta	aaacactgaa	gatttttctc	cccaaaactg
94441	ccaaacaagt	ctggtttaac	tgaaattgac	agcaaagaca	acagagcaca	cttaattgaa
94501	ttttaatctc	agtgatctct	aagccatgtt	tgaaacataa	acagacatgt	cagagttctt
94561	tatgatgttg	gacatgaatt	cattttcata	attcaaaggc	atactttgct	tatgaatctc
94621	tttaacaagc	tttggctgaa	tattcttttc	ttccagatgt	ttgctgttgt	atacacacag
94681	cttccatctc	tttgcatag	atttaaaaca	tagttagaaa	gagtacattt	atttaacaaa
94741	agagtaagag	tacagaattc	aaatagatcg	tctgtgggtg	tatataatga	tgagtacata
94801	agtctcatgc	agtcctcata	aagacagcat	ctattaatct	gaagaagttt	ctcttactaa

```

94861   ttgcaaacc   taaaagcatt   ttacattact   aagatattaa   taaataggtc   aattaatact
94921   tttgatagag   tagagagact   cctaaataat   ggacatgaaa   aatgattttg   taaaagtaYg
94981   gtttcatttt   aaatccctgc   ttaagcaatt   tgtaggaggy   aagatagtgt   ggcagttagg
95041   aggatgggtct   ctgaaatcag   atctgaattt   gaataccacc   tctaccattt   actaacctaa
95101   acaagtcata   ttacttctct   gtgtctcaat   agtacttccc   tgagggtgtc   ttacaaaaac
95161   acaaaataaat   aatccatgta   aagaactttg   cacagtgcga   atacatagtg   agcacgcatt
95221   gagttttatt   tatcatcatc   atcatcttgc   tgtacttttg   taaactcacc   ttctcccgct
95281   tttttctact   ctaagggtgct   cttccaagct   actttcctcc   tcagctatcg   tccccctgga
95341   tttccagtaa   gagagggtga   aatcatgcct   gcttatcttc   tttctctttt   actgatactt
95401   cactgaagtg   aaagtaaagg   aataaaaaca   caacacacc   acccacaagg   gcacaaataa
95461   taaaggaaac   aagatcagca   aaggagagat   ttctactgat   tttttgaaat   cagaaaaatg
95521   ctgaagtgcc   ttagcataat   cgaggaaatg   gttacggaga   gtaaattcca   agagaaagtg
95581   gactaatgtg   ttctcccgaa   tccagaaaga   cttactgctt   ggaggcagca   gaattaaagg
95641   aggcaggagt   ttagcgaggg   gctgaaagtg   tattaaaatt   atatggagcc   ttggatcca
95701   aactaactac   ttcccttacc   tactggaagc   ggagtctttc   tttttggag   gaaatcggct
95761   agagagattt   gaaactgatg   atactaggca   ctgtagcaaa   ctaggagagg   ctgcaggttg
95821   cgaaatagtg   gcttatttga   aagcctatag   agtttgcaat   aagaaaccca   acttttttat
95881   ttgtcatgct   cccagacat   tagcagtcag   ttatatgccc   caggcgcaaa   tctcgcaggc
95941   agaagtgagg   gtacccctta   atcatgacct   tggggaacaa   tttcaaagaa   cacaccggct
96001   ttgattgaac   aacctatgat   gcaacagtgc   aaccctacag   ttgacgagcc   ctatccatga
96061   tcacagaact   tctgacattg   ttctttgcca   tcattgtcat   tgttgctttg   tttgtgtgtg
96121   gtgtgcatac   gcacctgtat   atgtcttgct   ttaactaag   aatgaacagc   ctcttaagga
96181   aactctccat   aatgaagaag   agaaactaga   agaagcaaac   atcaactgaa   gaaagaaatc
96241   tacaggaaag   agagagacag   aggaaaacct   caagaggata   ataactctgt   accttagata
96301   aaacacactc   ctgacataag   aacatatacc   attaaaaagg   agaggatgag   gctgggcattg
96361   ttggctcatg   cctgtaatcc   cagcactttg   ggaggctgag   gtgggcggat   catgaggcca
96421   agagatcgag   atcacctctg   ccaacatggt   gaaaccccat   ctctactaaa   aatacaaaaa
96481   tttagctggg   gtgggtggat   gctcctgtag   tccagtttac   tcgggaggct   gaggcaggag
96541   aattgcttga   acctgggagg   cagaggttgc   agtgagccaa   gattatgcca   ctgcactcca
96601   gcctgggtgac   agagcaagac   tccgtctcaa   aaaaaaaaaa   aaaaaaaaaa   aaaaaaggga
96661   gagaatgaga   gtgctaaatt   atttttaaat   catgacccaa   ataaacattt   taatagtaag
96721   gttgggaaat   aaaaatgtgt   gtgaacaaat   cttctagaag   accaaaaaac   aaaaagacaa
96781   aaaaaggaga   aaacaattaa   gaaattaaag   gatagtactt   aggagatcca   actaagataa
96841   tgagaattca   aggaagaaag   aacagagaaa   atagagggca   taaaattatc   aatgaataag
96901   agcaaacatt   tcagaactga   aggactcata   tctctggagt   gaaaaggctc   attgctgtgc
96961   gaagggaatg   gataaaaatg   cagaccaga   caattgatca   tgaaatgtgg   gaacttcagt
97021   aaagaaaaga   aggtcacaaa   aattttctaca   cagaaaaaga   tcaggatttc   accaatagaa
97081   aatactggag   tgatgcctac   aaaatgttca   aaaaaataca   tttttaacat   agaatccaat
97141   tgcagttaat   ccatgcctga   gacaaaaaaa   ggtttaaaca   aagggtgccc   tctgaatagt
97201   atatagaaaa   gatttctgaa   cagaaaatct   taaaaactag   cttttatccc   caacttggtg
97261   actaaatata   gagacaggca   agaattaggg   gtcttcttgt   cattctcttg   agactctgga
97321   gctcctgaga   cttctttttc   actaacacca   ttgaatccgg   gaatcaacaa   gctgcacaaa
97381   gttataaaga   ttgccagact   tcatgtttct   ggaaaaaaa   aagtactatt   tttctacata
97441   gctgagacct   ctgaaaagat   ggctcaatgg   gcaagatgcc   atgagaaatc   aaagccaaat
97501   actcattctg   aagtcagttt   tgctcagact   ttgtatactg   ccaactcaat   tttcaagtca
97561   tcagaaacat   aactaagaat   gagtgacttt   ttgctatYaa   ctaatgaccc   accattcaac
97621   gatcttgtat   gacaaagtag   aggagtatct   tcttattttt   aggcttatta   aattacaatg
97681   gaaaaatatt   attaacatc   tcataatgag   gcattctaga   tgcttattct   tacctaaagg
97741   gaatggaaca   aaaaataacc   aaaaactaaa   aagatgaaga   caaaagcctt   tcttggtatt
97801   atagtattct   ttacaaaagg   atatggttta   tcatagtaat   tgattccctc   tgttacacta
97861   gagataactat   tatattaaat   gcctaaaagg   taaacttagg   taacagtgga   gctatagttc
97921   ttccagaaat   aaaataatta   aatagctatg   tatgccaaga   aaccttactt   tgaacatttc
97981   tattgtacca   tctcattatt   gctggctgcc   tgattagcaa   gcagtaaaact   tgggtaatat
98041   ctttctctg   atatcacttc   aagtctactc   gagttctaga   attaccaga   ctaccaggac
98101   tttacttgca   caatatgctg   aaatgtttat   aacattatgc   tttccctccc   taattctcaa
98161   gaccattttg   ataactggct   aagactggat   aatatcaaca   aatatgaaat   aattataaga
98221   atcattcttt   cttaaaataa   gaagagtctc   cagaaacaga   aactaaaaca   gaattcaggc
98281   taagctgcta   aataggctat   ctgaggatt   ctgagctcat   tcttgatgag   gatagattgc
98341   tttttatttc   ccttaagtgt   tccgtattta   tttcacaaat   attacttaac   tgtgtaccat
98401   gtacaaagcc   gtgtgctagt   taagctggtt   actgtggaag   aaataaaggg   agtgggagca
98461   tctagctttt   ttcttcaaag   gagatggggg   aatctgtggg   agttagtggg   aggggcacct

```

```

98521  acagaggaaa tWgctgaaaa ggaggagctg gggaagatga ggatgaggaa ctaagttgtg
98581  aataaaggaa gggcagagca atggtttttt taataatatt ggaatgggat ttgttttttag
98641  cactgtctcc ctttccttta acagtccctt tgagctacaa ataatgttaa ctggc aaagt
98701  ggataataag acttcagaat cttctaagcta accatgatca atgtgtcatg

```

Following is a genomic nucleotide sequence of a *GPX3* region (SEQ ID NO: 5).

>5:150384801-150484800

```

1      ggcttatgtc tacaatccca gcactttggg aggccgaagc aggcagatca cttgagggtca
61     ggagttttgag accagcctag ccaacatggg gaaaccctgt ctctacaaaa aaatacaaaa
121    ttagccaggc gtgtggcac acaagaggct taggtggaag aatcgcttga acccaggagg
181    cagaggtttc agtgagccaa gattacccca ctgcactcca gcctgggtga Yagagtgagg
241    cctgtgtctca aaaaaagagg aagaaaaggaa gggagggaag gagggaggga ggaaggagca
301    catacttgtc tgaggatcag taataatacR tataataata acatctgact ttcattgaaa
361    acatattatg tgccaggtag tattctgagt gcttaaatct attgattcat tctgtcctca
421    caactacaag gtagtcactg ttactattct tttttataga acagaaaatt gaggcccaaa
481    gagatcaaat aacttaccct gtccctaatt agtaatggag ctaggactca gaccatggta
541    agctggatc agagcctttg tacttaattg caatgcctct tScatatgYg ctaggtaggg
601    aacaagggtga tagcagaatt taatagtcag gattgatgca gtattcctga actagtatat
661    aatgagctag attaaaaact cagcaattag aattcagtag cgaatcaaat cctgagataa
721    gtaggatttg gcttatcctg tggccaattt tcctcgattt aaacatataa attcatgggc
781    cttcacaccc ataaaagaat aaattagtat tataattttt aaaaatgatg taaaattagt
841    gctttctgaa gtactgggta ggtgtttctg tttgcaaaga gaatttatgg ttttgaaga
901    ttagtttaat gttgatggg gaatagacaa gagccaaaag acactagaag caaagagaaa
961    aatgaaaatt aaactatagc aaaccagcag ttagttaata aggctgcagc tcagatattc
1021   ctgttcctca tccagtcctt actttttttc tccaatcacY gttgtYaccc tggtcagttt
1081   taattctgct aaataagctc tccccactga ccctgttgca actgtccttc tttgttcctt
1141   tttactattc ctcaagatta tttagtgttt ctgcccagtt tgcaaaatcc tatttgtata
1201   tagccatata tactttgttc attgtcatat tctgtttctg tttctactac tgcaattttt
1261   aaaaaatgtg gttttctttc ttgaaatgct caggggggata gactccattt Rgccttgata
1321   tttctttagt gccatatgta tattatgcat gaaagtaaag attcaatctc ataatatgac
1381   aaaaagttat gagtcataat acattagcag atatatttac cagtatatag ttaattgtgc
1441   ttctttctag aagtctggca agacttccaa ccacatgcag aggcaccagg agaaccaata
1501   aacacttttg aggcattgtt cattaataga ccagggaact gagacagagg aaaggKgtga
1561   caactgtaat gctcttgaaa atatatttca tctgagccca gactttattt caaaaattcc
1621   aaaaatgtgt ctgttatggg aggaatttga actaYttgga tttatttagt ggcaatagaa
1681   gatatgccac aMaaaaaaag agcatagtga atgtgaaaaa gcctccttcc agaagtCaga
1741   cctcattatg caaaagagaa ccataagaga gaaaagccct taatatgtac taagtgtggg
1801   aRaaccttca gcagggaatc aaatctcatt atacacctga gaatccatac tcaagagaaa
1861   acctacgagt gtgttgaatg tagaaaagct ttctcccaca agtcacatct gttgaacgtt
1921   agagaattca caccaggagg aaaccctatg agtgtggcga gtgtgggaaa gcctttttcc
1981   aaaacttaca cctcagcatt tacaggagaa ctcatactag agggaaaacc tatgtgtgtg
2041   atgaatatgg gagagccttc Wgcctgaagt cacacctctt tgtacatcag agaatacaca
2101   caggagagaa aWcttctgtg tgaactaagt gtgagagagc tttcagtga gtrtcatgcc
2161   ttattagaca tcagaaaatt tacactagag agaaacctta tacatgtaat gagtgttaaa
2221   aagttttttc tcaaaagcct gacctcatal attacagaat tcacacaggg aaaaaaactc
2281   atgtaaatgc agtcaatgtg taaaaaaaag ccttcagaca tagatcagcc ctctgtcgac
2341   ataagaggac tcataaagaa aaacatccct gaacaagaaa taaatatggg aatatcttta
2401   actagaactt gtagtgatag aaagccttca gtcaaaagca aaccttatta tttatcaaga
2461   aatcttactg aggataagcc tgtttaatat atttataaaa gcgcgcagtt atgtttctat
2521   agaaaacata ttccagatgt gattcctaaa tatttcttga ggatattaca gaaaatacat
2581   ttttattaga gaataaatgt tcaactgtgga ccacaaagc ttttaaaata ttaataagtg
2641   aactagtcag aacaaaactta gaaaacRata tgtggacaac ccacaagata tgaatgttac
2701   tatatgtgcc actacttatt gctgtaagtc ctggctgcac tacattttgc tatgtcatc
2761   ataaaataag ttatatgtgt tgggaattgca tatgtgaatc taaaaatttg taaatataaa
2821   ataattacta tatatagaat gccatttact aagactttct acattaaata ttaccatttt
2881   tcccttaaa gaaaatacaag ttataaccaa aaatacagtg ttcagtaaga gttctaaagt
2941   gtaaaataaa cttttttctg ttgctttctg gtatgtatga cttctgctgc ttcttaatga

```


3001	gaagtacata	aaggtgttaa	ttacataaaa	tatatataa	taaactagat	atcatataag
3061	tctcagtagc	aaaagaaaat	agtcattggc	tcttacaaga	ctcactgcaa	tttaRaaagg
3121	aattcttggg	gggtacaatt	acccttttta	catactgtta	tggaactgaat	tgtaccttcc
3181	caccaRattc	atatgttgaa	gccctaatac	ccaatacctc	agaatatgac	tgtatttggg
3241	cataactgctt	ctaaagagta	attaaaaata	aaccattagg	atgtgtccta	atctaactctg
3301	actggtgttc	ttacaagacc	tagagagtag	gacacacgag	gagacatcag	gggcagggtgt
3361	acacagagaa	atgaccatgt	gaagtggcag	caagagggct	gctatctgct	agccaagaag
3421	agaggcctcc	aaggaaacca	acccttttgc	acattgatct	cagacttcca	gcctccagaa
3481	ttgtgagaaa	ataaatttct	gtcattttaa	ccactcactc	taatatTTTg	taaggcagcc
3541	ctaggaaaca	aatacaaaaca	ctactgctct	ttttccctgg	agtactttgt	aagcttgagt
3601	atacaaaagta	taagtactac	gtaagccaat	aatatgatag	agtgcctgct	atactgcacg
3661	gcactctctat	ttggcatttt	ctaattcacc	ttgtgacaga	ttagtaagag	agatatTTTt
3721	ataaaggattt	tacaattcac	aaatattata	aagactTTTT	gcagagagaa	ttgttctttt
3781	ttaaaatttcc	atctaacagt	aggggttaggt	attctgtaaa	tttccatgtg	agtatccatg
3841	ccattaaaaa	tcaacttggt	ccttattttat	aaatTaaaag	tggggcctca	ttcttctaaa
3901	gcaaaattttg	acagggaggt	aagattacaa	ggcagaaacc	tacaagaggt	gttaagagct
3961	cttatttctgg	atttagacag	atgtagattc	tgaatctgct	ctgagcctca	atagcaccta
4021	gtttgttgga	tcattgcaag	gattatacaa	tatcatgtat	gtatggtgct	cataagatgt
4081	tagctattttt	atattattta	aggatataat	tcccattcta	gttatgaaga	cagacaaggga
4141	aacaactcta	attaggatta	tattagagag	aactgtaggg	agtcattgtgt	atcatttctgt
4201	ttcatttctca	caaccatgtc	agtctttcag	actcagggtgt	gggcctggaa	ccactgcctc
4261	gaattgcccc	tctacatcta	ttctataaatt	gcttgttcag	aagcaatacc	attgctgata
4321	ccccaaactc	cttatcttta	tctcatctac	tgatgagacc	cattgcttgg	agggtagtta
4381	catggaaagc	cattcacaaa	acaccttatt	aactttgtgg	gtgaaaaaaa	agtgatatctt
4441	aattgtatta	agccactgag	atttagggat	tgattattaa	tagcaaatag	caatcatttt
4501	ctagtagaaa	gaaattgggtc	ctggaagtgt	cctgctaattg	taataaaaaac	ctaaaatatg
4561	gcataaggcct	agtagttgag	cagtggagaaa	actgatgtca	gaagtggaaa	gatgtttatc
4621	tatgtttttgt	actagccaaa	catttgggtt	gggccaggcg	tgggtggtca	cacctgtaat
4681	ttcagcactt	tgggaggtca	aggtaggcaa	attgcttgag	cccaggaggt	caagaccagc
4741	ctagacaatg	tgatgaaacc	ctgtctctat	aaaaaataca	aaaattagcc	agatgtggtc
4801	gtgtataacct	atagctccag	ttactcaaga	gcctgaggca	ggaggatttc	ttgagccccg
4861	gaggttgagg	ctacagttag	ctgtgatttt	gtcgtgtgac	tccagcctgg	gtgacagagc
4921	aagaccctgt	ctcaaaacaaa	acaaaacaaa	acaaaacaaa	acatttggtt	tgattgtctc
4981	ctctacacat	gcttactttg	ttgacagctc	cagaagataa	ttagaaaaca	gagtattagt
5041	aatatttgct	gttttactgg	ctgtatttgg	aagctattgt	aagaaaaaga	taaactcaga
5101	gaaaaattagt	ggattataag	caaaaatgaa	agaaaaataga	gtcctgaaat	ttgagacctc
5161	atggagttta	aaaaatttga	ttctagact	tcaaatgtta	ggagaataat	ttaaatgggt
5221	ttgagtgtat	caaagaccta	ataaacattt	gctagtgaat	taaagtgact	cagaagaaaag
5281	attatattaa	gaaactgaaa	ccttctcggt	caagcttgat	aaccttacag	tagtctgtta
5341	ttcacctacc	ctagctccat	gatggagaag	ctcaatttta	ggcagctaca	gccaagaaga
5401	ctggggctcc	catacccaac	ctagctccca	cttgttagagc	agaggctctt	gccaaggtaa
5461	gagaggctaa	gagtattggg	acctcaattg	ccctcctcct	cagcttttct	ctatagagta
5521	gatgtttcat	gccaggaaaag	gcaagccaaa	aaaaagatca	ttctcccagc	tcccactaat
5581	aggatagagg	ctccagactg	gcaggagtac	attaaaaaga	Yctcaggcct	tcattcttct
5641	accaagatct	cacttgcagg	aaggagtatc	cctgctaaga	agcttccccg	gattccactg
5701	gtagggcaga	ggtgtcactt	caggaaaatc	cggcKttccc	ctttgtcccc	cgcttctgtg
5761	caagagtgtg	gatgttatat	ccagggaaaag	aagcaagatg	ggagggccag	aagctcctca
5821	gctcagctSg	ggggctgact	gtatttaatc	ataacatgaa	gggttgcatg	aattaaggca
5881	ttgttgaaaa	tagagatctt	agtggcaagc	acttaagaga	attctaatag	tttcataaaa
5941	caagtagcaa	caaataaaac	agcaagtcac	ccggtttaac	agagtgaaca	agagaaaagag
6001	ctaaaactgg	aagtctgtgc	atatgtctat	gtttcacaca	ttcaggacca	accataacag
6061	gtactagctg	aacttgagtg	gaattgaaag	aatttcccaa	gccacacgct	gatacattag
6121	caaagagtg	aagtcttact	agctcaagga	gtgtaagcac	aacccttgac	caaactctgg
6181	ctaaatgtta	agatatTTTg	accacaaggt	gacttctagg	aagccaggct	tggggtaaaa
6241	gctacacact	gtgggggtgg	ggggcgcggg	gggaaataga	gtttacaaag	ttgggtgcaag
6301	caagccacta	aacaaactaa	caaaaacagag	ccacatcaat	aatccctaaa	ggggatgtgt
6361	cagaatccag	agttgttaca	atatattatt	tcaaaaacta	ttagagatgc	aaaagaacaa
6421	aatagtataa	cccttgtaaa	ggaaaaacag	catcaataaa	aactgctttt	gaggaggctt
6481	agatgttgga	cctgttaaggc	aaagatgcca	aagaagctat	tacaaatatg	ttcaaaaaac
6541	taaagaaaac	catgttcaaa	gaatgaaagg	aatgtatggt	gacaatgact	catcaaatgg
6601	agaatgttag	tagaataaaa	agtgtttaaa	gactcaataa	aaaattctgg	agttgaaMag

6661	tagaatacct	gaaatgaaga	ttcacttttag	gtactcaaaa	gtagatttga	gctggcagaa
6721	gaatcagtaa	gcttggggct	cgatcattcg	atattataca	gtcttagaac	agaaagaaaa
6781	aataatgaag	aaaacctgag	cagacttctg	gtttctagtc	tgacatgtaa	agagcttgga
6841	agttgtcaat	cctatcatca	caaccagaaa	aaagtctgaa	aaactggaaa	taaacaattc
6901	ttagatcctt	caaagaatca	aggtcacagg	acaaaccact	gccccagaaa	ctagagagac
6961	aggtagatgc	tgagaatcac	aggttcactg	acagcggaag	tccaccacta	aagtcaatat
7021	attttaggaa	cacttaaaact	acaattgatg	aattgctaga	gactagcaat	aaaagtgccca
7081	gcattctagt	tgatgaaaat	gttgtgacca	gaggcttaca	tgaacctaat	cctgtattcc
7141	tcttgaggca	attattcagt	atttactaat	acagtgtttg	tggtggattt	atttaacata
7201	agtactgtga	ataataaaat	caactgtata	tgaatctctg	actatccatt	tacatgtagg
7261	agaatcaaca	aatggtattc	tccacaaatg	gaatcaaccc	ctagaagttc	ctgagaaatc
7321	cctgttgagt	gggaaaggac	ctagagccaa	ggagacaagg	ttggagggtga	ctggctctct
7381	tcctttgttc	ttccactgaa	attacttgag	aagcatcatg	acacatcctt	atacagagg
7441	tatggtggaa	aaataattgg	cagtcaaaaa	gacttaagt	tatgaagact	taagcatgat
7501	acacatggag	aaggtgatgg	tgtaaaagat	gacaatggcg	tctgagtaac	attctgaagg
7561	aggagggaag	ttcaaaaggt	gggatggtgt	gcctggatga	gacacatgag	ggagaaggat
7621	tttctatggt	gcttctgtta	gtttagcagg	tagaatgccc	ctgtgaagg	tacagggaag
7681	atgtggcaga	gtgggtgcct	aagtctgggt	ttaggagac	tttagaaaca	atttgaaacc
7741	cagggctcta	ccctctgttc	acctcataga	acagtaaaat	cccttggatc	aggcaaaactc
7801	tgatgaaaaa	cccagactgc	catctctctc	ccagatggcc	aattttcctt	ctggtgctgg
7861	cgaatgatga	agttgtcttc	aggaaggcag	aattctgctg	Sgtgctctcc	tcttctgagg
7921	agtataacca	ccacacagcc	tttgctccca	gaaagagtca	ccatcttggt	ttctaacaatg
7981	gatcccttgt	aagcccatat	aaaccactcc	atccatactt	aactgctttc	tccacaaagg
8041	caactgagtc	taggagccaa	tggactatct	cactttattt	tttaaaattt	accagggca
8101	ctttttcatg	ttctttcttc	tccctggaac	ttactagcat	tatggaacac	aaggatgtgt
8161	ttgtggtcat	cttctcttta	caagataggt	cacatagacc	cataagtagg	ctgtgtatac
8221	ttttcttaca	aaggaggtgt	cacttacctt	gggaatacca	gccagccaca	tatgaaatcc
8281	cagacacag	agacccttaa	gaaaaaggcg	aggctgtctg	taactgcctt	agcaactaag
8341	ccaccagtgg	attcaactct	taaaattaca	gcaccatgga	aacacaaaa	cacagaattt
8401	tgggaattgg	taacactaga	gagctcacat	aattaaatc	cttaatagaa	aattctcatt
8461	tactaattag	aagtttttta	ccatgtagt	taaccatgta	tacactattc	tcaaagagaa
8521	tgggaatatc	ttcttcagtt	acttaatgaa	aacatacaag	gaatctgaaa	ccctaacata
8581	ccagaatcca	tgggacaaaa	ggaaaattat	ttgatcatgg	gattcagaag	catttactgg
8641	atcaagggtt	agagatgctg	aaagtagaga	atcagtgtta	ggttttggag	ggaaggcaag
8701	ggttaaagga	agacagagag	agaaacagag	caactcaaca	gcaaacacag	gtatatgtca
8761	gacacctgtg	gaagcgggag	acccgcttaa	tgccaaaacc	caccaccact	tacaagcagc
8821	agtacttaca	ggtatggctg	ggagaagtct	ggatagtgtg	gcttgcctgc	cggcaggata
8881	tcaataagat	gtacccatga	taggggtggt	tgaccctttt	tctggtggga	tgatcatctg
8941	gtgttctctg	ggcctttgcc	cagtaagaca	ggataggag	gtttctttag	ttgggctttt
9001	gcctggtagg	gtataataag	aatgtttttt	ttattgggcc	tttgtcttcc	ttgtggtcag
9061	gtggccaggt	aggatgtttc	tcatggccca	aaccccgctg	gaatgtttca	ctttgaccaa
9121	ggtctgcaaa	atagcagggg	acttacaaaa	tggtgccgtt	tgactaaca	caaaggtgaa
9181	tggcatgggg	aatggtaggt	caagaaagct	gcttccctaa	tttatccctt	ctctgaaat
9241	gtcttcatta	ttaaagactt	cattttaact	gcctttggag	ttaaaaata	aaatatgaat
9301	tttaacacag	aagtgtgaat	gctgggtatt	ttgaaatcaa	gttcttataa	tcccaggcta
9361	gtgacagctt	gcctgggcaa	ctaagtaact	taagttcata	agtaaacact	aactctgctg
9421	aaactaaata	actcatttta	gcttctgaac	attttaagca	tttctcattc	tggataagaa
9481	agagaaatgc	tgaagcagaa	tttatttcat	ctgctttaga	tgaatttagg	aatcccttgc
9541	aaggcataaa	actaattttg	tgatcccttg	agtaatatgg	atttctgagg	aaattctaga
9601	ttcagagaag	tgctgggcca	gatttttggt	aaggcaatga	catggaaaaa	ttttcaaaag
9661	aagaggtaaa	aatatgtagt	ggagtttttt	tgtttttttt	ttttcataat	caggagtttg
9721	agaggggtata	atggaagtgt	ttaggttttg	acgggaaggc	gagggttaaa	gaaagacagg
9781	gagagagagt	tagcagctct	acagcaaa	caagttttat	gtctagcaca	agacctgcgg
9841	aggttggggg	ccagcttaat	gccaaaagcc	actgccgctt	acaggctggg	gtacttatag
9901	gtgtgggtgg	gaggggtctg	ggcagtatgg	cttgctgcct	ggcaggatgt	tgataagatg
9961	ttcccatgat	gagatggttt	ggtctttgtc	ctggcaaaat	gtgatagtga	tgttccttgg
10021	gctttttccc	agcagaatat	ggtaagaaat	tcagggtggt	gagcaaaatg	tttctcatgg
10081	cctgaatccc	catggaatgt	ttcactttga	ccaatgtctg	cgaaatgatg	gggggcttac
10141	aaagtgggtac	agtttggatt	aacattcttg	ccttctactt	cagtctaaaa	ggaagagggg
10201	cattgttgat	tatctagctg	cttcctgctg	aataggggca	ctgtaatcag	ggcttgggtt
10261	ttgaagcagt	gggtgtccaa	cttcagagtt	gttttctctg	agatgttgat	accagacttg

10321	gtggggaaaag	atgggtatcaa	tgtgtttctg	ggtggctgcc	tagacaaggt	agttctgcct
10381	ttggggagata	aagtgggata	tgaaggtaag	tatacatggg	ccaattgtga	gtattaggag
10441	gaagattagg	ggccctaaga	aaggggtaac	cagatatccc	tgtgccagt	gtagctgaga
10501	tgcttagtcc	tgctaacagg	ggaatgaagt	gtatagccca	cttgggtgtg	gtggaggagg
10561	aggaaatagg	gattactaaa	gaacctgaat	ggtttgattg	ttaggcaaaa	tgtaaatgtt
10621	tggagattga	aacaccagg	tacatgttcc	tgaccaactt	gccagtaggc	aaagaagaga
10681	gtttgttcca	cacagaaaga	aaagactggg	ggttgacagg	caaagttgta	agtgaaggca
10741	gtgagccatg	agaagccggg	ggttaaatcc	tgaacaaact	tttgtcccaa	cttttttgtt
10801	tttccaggtt	gaataactgt	taacaaggat	agtcctgtt	agggcctgat	agggatatgt
10861	gtggtgaagg	ctgtctgggt	ttagacagag	agagagaaat	gggttttgt	taacagccat
10921	tcggttcctg	acagggaaga	agaataaagg	ttgcagttga	gggaattgtc	tgtgcatttt
10981	tttagggagt	tcctttaagt	tggatgcatg	gagaacagtg	ctggcagaga	agggaggggg
11041	tgggaaggga	tgttttatgg	aattcagttt	gtaacatgtt	tagtttacag	gccatgagac
11101	gaaagagggg	gccagccctg	cgtgcgatgg	tcaggttagg	tttgatggat	tcaggggaaa
11161	ggtgttttag	caagcaagat	tataaacagg	ttttgggaag	ggactgggtg	agtaggtgag
11221	atgcagggtt	actttggatc	aagtttctgt	ggttaggtta	acaggaagg	ctgtgaactg
11281	ctggattttg	gtggacaaac	aaattttaaca	attggaagaa	agaggagagt	gtgactgatt
11341	taagaggtaa	tgtgtgaggt	tgacaaagga	agcccaactg	ccagagggtta	tgggatttag
11401	agtatcccac	agcaaagaca	aaaggggaaa	aagaagattt	gagtacRagg	gaaattttgg
11461	aaggtRccct	gcagccatag	ctcctgggtt	aatgtgagga	attggagtg	actatccagg
11521	gatgtgggga	gggaatatca	ggaaagatct	gaaacaaggt	gtgagataac	agatttgaac
11581	ttggaggcag	agagtgtaat	ggaccagggc	cttctggact	ggcaacttct	ggaattcttg
11641	ttaagcatag	tgaggttggt	cctatgaagg	aggaagaata	ttttgggggt	gagaaaactt
11701	ttggatgtaa	gtctggtgct	gttttttagt	tggaaatggt	gatttagtgt	ggaaaggatg
11761	ttagttttgt	tgccacagga	gtagtacagga	ttacctggtg	aggaccctgc	cacttagggt
11821	ggagagggga	gaagggaattg	gtgatttaga	cccagttccc	tggttgtagg	ggcagggagg
11881	agtgttttgt	ggatggactt	ttaggctggg	gcaagtaagc	atttgcgtac	cgtcttatta
11941	gatgttgagt	gaggtataat	gccagccaag	tatcctgtat	caaRgagggt	gaggggcggg
12001	ctgggggagc	atacagggag	attttgagg	ataaaaaggg	attggtacat	gaattcaaat
12061	gggcttaggc	tgaggggctg	gtgagcaatg	gcttgtaaat	tcagttagtg	cattggaaga
12121	agtgaagttc	aggccatttt	aacctctagg	aagtttggtt	atttgttgtt	ttaaaaaggg
12181	attgacctat	ttacttttat	ctgaagattg	ggggcagtaa	ggaacatgaa	aggccatttt
12241	aatgtttaca	gcctccacca	actgttggtt	aacctgtgaa	acaaatgttg	gccactgttc
12301	taaccggatg	gaggagggga	gtccaaacca	ggggatcata	tgggtgagga	gaatagaagt
12361	gatgggtgtg	gccttttcgg	tgggtgtagg	aaaatctttt	atccatccag	agaatgtatc
12421	tacaattgtg	agaaggtacc	aggccatttt	tatggggacc	atgagggtaa	agttgatctg
12481	cccgcctgc	cctggcaggt	gtccttgggc	ctggtgtgtg	gggaaaggag	gtggtttgat
12541	agctccctga	gaggaagttg	tttgagtga	aatggaatat	gccttagtaa	tacctatgag
12601	attggcagcc	atggcgggaa	aatatatata	agcttttaag	agctagagta	gggggcagta
12661	accggcatgg	aaatggttgt	gcacatatga	aagtacagaa	agttcctggg	acttgggcaa
12721	gacaattttt	ttattggggg	agaaccatcc	tcctcccaa	atagcaccag	cccgggtgag
12781	tgaggtttgt	tcctcctggg	tatatacagg	gtgtatgctg	ggaaagatgg	gcaataatga
12841	tgaggtttta	agggtgcctt	gctgggctgc	agagtttgct	gagaagtttt	ccttggttat
12901	ggcatctgta	gccttttgat	gtcccttaca	atggataaag	gtggccttta	gtggtagttt
12961	agctgcctcc	agcagtttgt	gtatgagttt	gccatttact	atgggggttc	cttttgtagt
13021	taggaaacct	ctttcctgcc	agattaaggc	atgagaatgt	aggatgtggt	atgcatattt
13081	ggaatcggtg	taaatgttaa	ccctcttgcc	tttactaggg	tgaaggccct	ggttaagaca
13141	actagcgcca	cctgttgaga	ggtagtatgg	agcgggacag	tgctggattc	taggagttta
13201	ttttcagcaa	tgatggcata	gccagctgct	ggacatggct	ccctaaaaca	gctaaaaaga
13261	tcctccatta	atgaatcatg	tgggtgttcc	ctgcaaagg	gcttttgaaa	tgtgttgga
13321	gggggagaa	agggagttaa	agaggtccag	gcaggagtga	gagagcttag	agtcagaggt
13381	gtttacaggg	aagagggtgg	ctaggttgag	agctttacat	ttctagaagg	tgattagagg
13441	gttacctatg	aataaggcat	gtatctatga	ataaggcatc	ctgtaaggag	gatggtggga
13501	gggatagaa	agatcaatgg	ctcatgagat	cctgtaggtt	atgggaagat	gcagtagtaa
13561	tgtgttggtg	gagagtaagt	ttctgtgcct	ctgaggcaag	taatgtggct	gcacccaaga
13621	tttttgggca	ggatggccag	ccttggtatg	tagtccattt	gttttaagag	gtatgcaatg
13681	gcttgtggag	cattgccata	tgtttggcag	agtagtccaa	gagcaaggcc	ttggtcagaa
13741	gtacacaca	gtgaatgggg	ccagcccctc	cacacctgtg	ggattttctc	atcaggcagg
13801	acgagagact	gagaaaagaa	ataagacaca	gagacaaaat	atagagaaag	aaaagtgggc
13861	ccaggggact	ggggctcagc	atacagagga	cctgcaccgg	cccgtctct	gaattccctc
13921	agtatttatt	aattactatt	ttcactatct	cagcaagagg	aatgcggcag	gagaagaagg

13981	tgatagtggg	gagaagggtca	gcaagaaaac	atgtgagcaa	aggaatctgt	gtcgcaaata
14041	agttcaaggg	aaggtactat	gcctggatgt	gcacgtaggc	cagatttatg	cttttctcca
14101	cccaaacatc	tcagtggagc	aaagagtaac	agcagcattg	ctgccaacat	gtctcgccctc
14161	ccgccacagg	gcagcttttc	tcctatctca	gaattgaaca	aatgtacaat	cgggttttat
14221	accgagacat	tcagttccca	ggggcaggca	ggagacagtg	gccttcctct	atctcaactg
14281	caagaaggct	tcctctttta	ctaactctcc	tcagcacaga	cccttcacgg	gtgtcagcct
14341	ggggggcggt	caggcttttc	ccatcccacg	aggccatata	tcaggatgtc	tcagtgggga
14401	gaaaccttga	acaatacctg	gctttccagg	gcagaggtcc	ctgcygcttt	ccgcagtgc
14461	ttgtgcccct	ggtttatcaa	gactggagaa	tggcaatgac	ttttaccaag	caacctgcct
14521	gtaaacattt	tgtaacaag	gcacatcttg	cacagcccta	gatcccttaa	accttgattc
14581	catacaacac	atgtttttgt	gagctcaagg	ttggggcaaa	gttacagata	aacagcattt
14641	caggggcaaag	caattgttca	gggtacaggt	caaaatggag	tttcttatgt	cttccctttc
14701	tacacagaca	cagtaacagt	ctgatctctc	tttcttttcc	ctacaataca	gagtagaagg
14761	cttggtggag	ttgggcagtc	ccagtactgg	ggccattaaa	aagggcattt	ttcagctttt
14821	taaagtggga	gttgatgggg	caagctgggt	tgagggggtt	taggatgagc	ccatgtgagg
14881	ccatatagaa	cagcttgccc	agcaagccaa	agttgggaat	ccacagatgg	aagcatccca
14941	tgagcctga	gaaggagagg	aggttatatt	tcgtgtgggg	aagagggcatg	tcccaaatta
15001	gctcctttca	ttgggttggg	atggcctgag	aattaggggt	taggacaagc	ccaaggttaag
15061	tgacctgcat	ttgggctaac	ctgagccttt	gtgggtaaga	ccctaaaatt	tacttggtat
15121	gtcccacccc	aagatagggg	tagggcactg	agggataaac	aggaaagagt	gggtgaaggg
15181	ggtgatgaat	aggttgcata	atagaggacc	agtctgtttg	tgccctagagg	ggattctatc
15241	gactcccaca	atagagatag	aagaactgag	gaggggctca	gaatattctg	gtaaaattga
15301	ataactagcc	tcataatata	tgggaaagac	atgggcttag	cagacactga	cagcattact
15361	cttgggtcca	aggtggtgat	ggtggtggga	gtggtggatt	ctgggccccta	tcagcttcca
15421	ggtagagggt	gtgaagtggg	ataaagcgtt	ttgctgagca	cagtctgaga	tggtctccct
15481	gtcctccagg	gtgaggagg	aagagaggat	gacgtaagt	tcattgccagg	taatttataa
15541	gattgagtga	catacagaaa	ttccttgttg	aaggagggtg	gatccatgga	aaagaagcca
15601	agtccttttt	caagctggaa	gaggtcagct	agggagaagg	aaacataaac	tcagattata
15661	ccttcggccc	gcgtgacttc	ccgcaagggg	atgacttttg	aaggcctttg	gggtgatgcc
15721	tggttttcag	aggaaggggg	ttaagtgtga	gactgggtat	gcggtggaga	agaaaggggg
15781	aacagagggc	aacaataagg	gaKtgaagga	gccggagctg	aaggaggagg	aggggatggt
15841	ggtggggagaa	ggactgaagg	aggggttttg	ttgtccgggt	tgaaattaga	ggaggaaagg
15901	ttgtctgaag	gaaggggcat	ttttgggttt	ggagggtcca	gattagacat	ctgagagtgg
15961	tgctctggag	aagttttgag	gagccttgcc	ccatactggt	ggctggaagg	gtgagaaata
16021	tagaggagg	gtgtgagtac	cctggagggg	agtaagtacc	atgattcctc	ttgggaggag
16081	ggacataaga	aagccagggc	atccctcgag	ctcttcacag	tcctctggag	atcagagtga
16141	ctggagtggc	gagcattctg	agggcgtccc	ctgagaaggc	agaccatggt	cacctggtga
16201	ccaggggagac	ctctcaccca	gcactgggat	tttctggtga	aggagcagaa	gcatagKagg
16261	aatctggaga	ggaggtaaag	ggagactcac	ccattaattg	gagacggcgt	tggacgtgat
16321	gttctgcaat	gggggtgatc	cttgccggag	ccaccagaa	agggggagaa	agaaaaaga
16381	ggctagagag	tttgatcagg	atctagaggt	cagcccagg	ccaaaggaga	gagaataaga
16441	gaaaaagggc	tgcaaaagg	gagtctactc	aggatctgga	agcaggccctc	agtctaattt
16501	ttgctgcttg	ctgctttcca	ggttgcaaga	gaagacttac	ccgtttagaa	cccaatctat
16561	gtcctgggtt	tctgcgcca	aatgtagtgg	agtttttttc	ataatcagga	gtttgagagg
16621	gtacaatgga	agttgttagg	ttttgaagg	aagggtgagg	ttaaagaaag	agagtgggat
16681	gctttgcagt	aaatgcagg	tttatgtcta	gcccaagacc	tgcgagggtg	ggggaccagg
16741	ttaatgcctg	aaccactgc	cacttacagg	ctgggggtact	tacagggtatg	ggagggagg
16801	gtctgggcag	tatggcttgc	tgcccaacag	gctattgata	agatgttccc	atgatgagg
16861	gacttggtcc	ttgttccagc	agaatgtgat	agggatgttc	cttggaacttt	ttcccagtg
16921	aatgtgatca	gaaagtcagg	tggtcaggcc	gatgtttctc	acacagagaa	ccacttccac
16981	aagatttaatt	ttccactacc	ttccaccact	tgtttgaacc	ttcagcttta	tcctattaaa
17041	ttcaaaacaa	tcttttaact	ctaggcaaca	atttatattt	ccatggcttc	ttataacctt
17101	ttagtaaaac	acacacacac	agacattttt	ccaaacacac	cttgcatgta	aaaatatttt
17161	tagtagtata	aattacatgt	tataatgatg	actcttagca	atcttacttt	taagtataaa
17221	gctggttaagt	tatgtttaatt	atgtactagg	tgctgataag	gtcttactat	tccagcatag
17281	ctaggggtgt	ggccaactcc	acatgtcccc	aggccttacc	tagctgtaaa	gcaggcaagt
17341	caaacaattt	tcaaaagcca	aagaagcagt	ttatgacctt	aaggcactta	gcaaacctaa
17401	tatttgaaca	taatttagat	gacatgtttg	tattttgaag	acattttgta	aaactttaca
17461	gaggagataa	acagtgactt	tcacgtctca	tttagccagt	ttgcacagag	agaaaggagt
17521	cagagtctga	ctggtaggaa	attcttatcc	ttttgccagt	aggccagggt	tctgggtttt
17581	ctctccctga	gcagccctag	tgaMctgct	caactgtatg	caaaacaaaca	cactaacatg

17641	aattaagaac	atttacaaat	agttttacaaa	ttttggagaa	attaggcaga	gagagaaata
17701	tgacttaaat	tctgttttaca	aaagtatact	caacatactt	aaaatatcaa	taagcctaaa
17761	ctccaaaaag	ttagtttaag	gttaaaaagc	tgatgtgttc	cattaactcc	tgtgggtctg
17821	acaaaggtag	cctaggaatt	ccagataaat	ggaacaaatg	atgacttgct	agaaatgcac
17881	aggaaacaaa	ataactatcc	acaaaaccaa	ataaaagcct	tctagaagca	aaaataaata
17941	aacaggaaag	caaccctaata	tttttcttac	tcaatttacc	ctggaggcta	aagtgttgcc
18001	cagggcccca	aaagagccac	ataataaata	ttttattcct	gatacacaat	tcaatatcct
18061	taagttcacc	aatatcatca	tacatcctgt	gcaatcaaga	agttcacttt	aggcccatga
18121	ccaataagca	ctccagtgc	agcactatcc	atgcaaaaaca	gtaaaccatag	tgtgaagcag
18181	tgcaagcata	tctgggaaat	ttggctccac	actaaatcca	gcttcaagct	taactatata
18241	aaaaaaagaa	ttgccaact	gccaatgcat	ttctttacaa	tagttattat	tttactttaa
18301	tcaagactaa	gagctttaac	tacgaaaatg	taaactagcc	caatgtctcc	aattctttat
18361	catgttttaa	agaatatttt	attatctaaa	ctttttccac	atccttctcc	cctaactcac
18421	ggttctttac	tacattgttt	cacaaataat	tttttcaaat	gtgtaatttg	aactaacttt
18481	tagataactt	cttaattaga	caaaattatt	ctttttctca	gtaataacac	aaactttttg
18541	gcacattttg	tatacagaac	tctgtgttaa	ctagaagtat	tatccttagt	aacctaaaaa
18601	tttagtgaaa	ccctaataag	aaatactgaa	ctatcagata	tgggcattta	tagataagaa
18661	caattccaca	attttttagaa	acataatttc	ccatatcaca	acccttctct	aattggaaat
18721	gacccaaata	ttcaatgagc	atcaaaaatta	attttaagct	tttaatttac	acaaaaaggt
18781	tacctaatac	atttatccca	tttactgtac	tcaattcttt	catttttaac	agtttatcta
18841	gattacttct	gtaaaactgag	atattagaca	ctatcactta	aagttagtta	tttcccttgc
18901	aaccatgttt	ctaatagcca	gtgaatatca	agtgtccacc	taaacctgag	agtctcagaa
18961	ttaaatatat	aagtattttg	ccaataactc	agaagacgta	gctaacatta	aattgctctt
19021	atttgtcaaa	aaaaaaaggc	acattttggt	ttggctgggt	ttgtagtttt	ataacattct
19081	atgccaaaca	ttgacatctc	aaaatattta	gcaaacacaa	acataaaatc	cagacaaaat
19141	gtatgtgac	aattctgaag	gcatttctat	ttttattcta	ccaataattt	taaagccagc
19201	ttgttttagta	aagtataact	taagtcaact	taacttaaaa	atcgcttagg	cttattaatt
19261	tatgagcgct	cttttactta	taagccaatt	tgccaaacat	aacatataag	tgtacataca
19321	aataaacaca	tctagacatg	tatacacaca	cacaaatgaa	gatctaatag	cttgaiaacc
19381	tagccatgag	atagcaaacac	aagcttaccg	gttttacttt	gtttgcccga	gtaggtaatg
19441	caatgaaggc	tgtaaccaca	aattttgggt	aaagcaattt	ccatggcagt	ttgatttttt
19501	ttgttttctt	ttcttttttt	tttttttctt	tgagatggag	cttgcctctg	tagcccaggc
19561	tagagtgcag	tggtgcaatc	tcggctcact	gaaacctctg	cttcccaggt	cctggttcaa
19621	gcaattctcc	tgctcagcc	tcctaagtag	ctgggattac	aggcacgtgc	caccatgtcc
19681	agctaatttt	tgtattttta	gtagagattg	ggtttcacct	tgttggcctt	gttcatgtct
19741	tgaactcctg	acctcgtgat	cYgcccgct	cggcctccca	aagtgcaggg	attacaggcg
19801	tgagccaccg	tgccagatg	gcagtttgat	tttttttgtt	tttgtttttg	agacagagtc
19861	tactctgtgt	gcccaggctg	gagtgacgtg	gcgtgatctc	agctcccact	gcagtcctcg
19921	ctcccgctgt	ctaagtgatt	ctcctgactc	agcctcctga	gtagctggga	ctataggcac
19981	gcaccaccac	gcttggttaa	ttttttgtat	tttttagtaga	gatggagttt	agtagagatg
20041	gggttttacc	acgttgccca	ggatggtctt	gatttccctga	cctagtgtatc	cacctgcctc
20101	ggcctcccaa	agtgtctggga	ttacaggcat	gagccactgc	acctggccct	agcagtttga
20161	tttttaaaag	tgaaacctcc	ccagactcca	aagaacacta	agaccaaaca	gtaccaaaag
20221	agaacatcac	tctttcacca	ggcctctctg	ttagaatagc	agcaccaaaag	cctggatata
20281	tgcaatggca	atgccatccc	agttttccat	tcaacagtaa	actccgcatt	ccaaacaata
20341	ttggggccaa	atagcattgc	aactgcgaga	taaaattcta	aggagagttt	aatactagac
20401	ctcagaacct	ctgccaaagg	catcctcttt	ggagaggttg	aggtccggag	gattccctc
20461	tggggcttcc	cctagtgggg	cccaatctta	agagtgtcag	acgtctctga	ccttaggtgg
20521	gcaccagtc	tgcttgcatg	ttttccctct	aaagggaaatg	gcctactatg	agctttcatt
20581	ttgtcccttg	atgaaggcct	tgacttttag	catccttata	atttgataag	gccacacttt
20641	cccatgtttc	ccattccatg	aacttaataa	ctggaggctg	gatgtgtttc	ttttgctctt
20701	agccagttga	ctagggaaac	ggaagaatta	cgcataagaa	aaggttttaag	ttgcctgaaa
20761	caggcgagtt	tgctctgagc	tgtgccacac	atagggatca	gggaccacac	ccagaaaaga
20821	tttaaaaaag	agtccttctc	ccttctgggc	agggcaatta	tccccattca	ctccatgggtc
20881	ttcaggcaat	attggggatt	gatcccagcc	aatttccctc	aatttccaaa	gagctactag
20941	gaaacagctg	ctaaaagacc	aataaagaag	aaaaggaaaa	aaaaaaagaa	aaagaccag
21001	gtcccttagg	caaaccaggt	ggtggcggtt	aggcttcttc	acatgaaaac	cccttagtat
21061	tcaccagcca	tgccagaaaa	cctgcagttt	acctccatgt	ttacacgctg	ctaccaagg
21121	gtcccagatg	ggaaaggaaa	agagagagag	agatttccct	gtatgtaaaa	agggaaagga
21181	gaaaaataaa	tcccaaaactt	tgggcttacc	ttctctgggc	tggtccacca	aaatatgtta
21241	ccagtggagg	gtgtccaggt	gcttggcatt	ttgaacaaag	aattgggaaa	aatgcacaaa

21301	caaagcaagg	aaagaatgaa	gtaacaaaag	cagagattta	ttgagtacac	tccacagtgg
21361	gagcaggccc	aagcagccac	tcaagggccg	ggatacagga	tcttcttggg	tccaaatacc
21421	cgctggaggt	ttcccattgg	ccacttggtg	ttcacgccat	gtaaataaag	tggtggcccc
21481	caatcagctc	gattgtttgc	agacggaaac	caatcagagg	ctgaagtga	gttacaaagt
21541	tacactctta	ggcaaacgcc	tggttgccaa	aagcaaccaa	tcagagggtat	tttctttttc
21601	tttttctttt	tttttctttt	tgagacggag	tctttctctg	tcaccagggc	tggtgctgag
21661	tggtcccgatc	tcggctcact	gcaagctcca	cgtcccggt	tcacgccatt	ctcctgcctc
21721	agcctcccga	gtagctggga	gtacaggtgc	ccgccaccac	gccccgctat	ttttttgtat
21781	tttttagtaga	gacagggttt	caccatgttg	gccaggatgg	tctcgatctc	ttgacctcgt
21841	gatccaccct	cctcagcctc	ccaaagtgtc	gggattacag	gcgtgagcca	ctgcgcctgg
21901	cccagaggta	ctttcaatta	accatctgcc	atgcagaaaa	ggtgggagtt	tgcaaagaga
21961	gtagcctctg	gtccttttgt	tacttaggca	tggaaagtta	gggttttcct	ttcaatgtag
22021	ttctacgaag	tcagcgtgaa	atggccttag	gtttcttatt	ctcctgcctc	actggtatcc
22081	aagggactct	gccattaggg	tagctgtgga	gggatggaga	gagagctgag	gcctcaaatg
22141	ccagtattcc	ttccttccag	atgtgctgtg	aagaccagat	aatcttccag	accaaacagt
22201	atctgttgat	gagtattagg	ctcgaatgag	aaggagagag	aagtggagca	ctggattgaa
22261	gagaaagcaa	aaaaccttcc	tagatcaaca	aggaatatagc	ctcttctaga	atccagatag
22321	ggccctggac	tcctgtggga	taatgtagt	ggtgaaaaaa	ttggtatgta	agtcctcgga
22381	tatggggatg	cacttggaag	tcttgggaac	aaggaagaga	gacatcctgt	ggtggtgatt
22441	tttagatcca	acaccagggg	gcttgggtgc	ctttgggggg	attagtagaa	gagatcgaca
22501	cattgagggg	gggtcaggat	aactgtctga	aaatgagaga	tttttattgc	ttatactgat
22561	gtcccaatag	ggtctgtatg	tgcttcaaat	aggtagaaaa	gaatgaagtc	cgagcctgaa
22621	gataacaata	tcagttagaa	tttttaggatt	gtgaataacct	gtccacagaa	atagctgggg
22681	ctgagccctc	tgctgatgat	gtaggaaatg	aggcagttaa	taagctttaa	agtcataagg
22741	tctcagggct	aggggtatgg	gaggacactt	tgccaccctc	aagggtcaaa	gcctcttgga
22801	ctggaggagg	ttgttaacag	atatttctagg	cagaaaagct	gtgtcagggt	gtggtgtatg
22861	aagagggaga	atgtgacacc	aatgggtcag	ctggccatct	gtcacctgt	tcccctgtgc
22921	tccctacttc	cacagggtct	gcttacagaa	caaggcacag	caaggaggca	agacacaagc
22981	aagaaatgtg	cttgatgtta	cccactgcag	tccttcttcc	actctggagg	attctgaaga
23041	ctcagaagag	ggacaggcaa	tggtatcagt	ctaaacccca	ggaccaggac	actgcctcag
23101	cttcgaagcc	tggtatgcaat	gctccagggt	ataaccactg	cccagaagca	cagctagtac
23161	aagctgcagc	ctcaatccag	gcaaggagcc	aactccaaca	ggtcaggctc	caagggatga
23221	agactgaaaa	catgaatgtg	ttgtgccact	aactctagcg	tttgcttttc	cttgtgtttt
23281	tgcatgcatt	gtagaccttg	gcatcagcat	ttggctagct	ttaaagacaga	aactgagaag
23341	ccttttgtgt	tttatgcgtc	aacttgactg	ggtcacagca	tgcccaaata	tttggttaaa
23401	cacgattttc	aggtgcatct	gtgaggattt	tctggacgag	actaatattt	gaattgaaat
23461	cagtggacta	agtaaggcag	actgccctcc	ccagtgtggg	tggtccctcat	ccttctctct
23521	gcctgacact	cttctagctg	gaacatttgt	cttctcctac	cctcggactc	agactatgac
23581	tggaattgat	atcattgact	ctcctagtct	ttcagactca	gattgtctct	Scgggacttc
23641	tcagcttcca	aatcacatga	accaattcat	tataggaaat	tttttWatat	atcctattaa
23701	ttctgtttct	ctggagaacc	ctgattaata	cagattttatt	ttcctacact	ccagtaactc
23761	tccactactc	cctccctcaa	cccctggtaa	ctatcctact	ttctgtctct	ataaatttga
23821	ctatttctcag	tacctcatat	aagaggaatc	atgcagtatt	tgctcctttg	tgactggctt
23881	atttcattag	cataatgttt	tcaagggtta	ttcatgttgt	agcatgtatc	caaatttaaat
23941	tcctttttga	ggctgaatga	tactccattg	tatgtatata	ccatattttg	ttcatcctac
24001	cattgataaa	catgttggtc	ccacatcttg	gctattagga	ataatgttgc	tgtgaacatg
24061	agtgtacaaa	tatctgagtc	cttgcccttt	tttttttttt	ttggacacag	agtctctctc
24121	tggtgcccag	actggagtaa	agtggtgtga	ttctcggctc	acggcaacct	ctgcctcctg
24181	ggttcaagtg	attctcgtgc	ctcagcctcc	ccagttagctg	ggattacagg	cgtgtgccac
24241	catgcctggc	taattttttg	tattttttaa	agagatggga	ttcgtcatgt	tgctagggtc
24301	ggtctcaaac	tcctgagctc	aggcaatttg	cccacctcgg	cctcctaagg	tgctaggatt
24361	acaggcgtga	gccaccatgc	ctggatcatt	gcttttcatt	attttgggta	tatacctaga
24421	agtgggattg	ctggatcata	tggtcattct	gatttttttga	ggaaccatca	tactgttctc
24481	cacagtgtct	gatgacctac	agtttttgagc	ttagcctttc	taaaaatagt	gggaaaaaaa
24541	tgaaaagaaa	acaactagaa	gtggaagtaa	tttgtccttc	attaagccag	atatacacat
24601	cctgattcaa	gcttgaaaac	aatatcacct	ccttcgctga	tatgtaagta	cctttttata
24661	atttaaattt	taagttatga	ttaattagaa	acttaaaatg	tatagtctgt	atatgactg
24721	gatgtccaca	aagtgccctc	tggttgctaa	atcttttgaga	aaggctgagt	agacactgaa
24781	cgaatgtata	tccaacttac	ttgtcaactc	ctccaagaac	attccttacc	ccctgaccca
24841	agacatgctt	tctatgagct	ccaacagtgc	ccctagtctt	caacagctac	cacatctgtg
24901	ctcgtcacac	tcttgccttc	ctcctagtct	caactgtgag	ccatggatgg	cagaggccgg

P A T E N T
Docket SEQ-4095-PV

24961	tttttaccct	tcaggctctcc	agttaggcct	gtgatgggtc	taggggtttg	tttaggctgc
25021	gagtctgatt	ggggctagga	caaagggtca	aattcaggat	gaaaatcagc	ctggccaaga
25081	gcagtggata	catagccccc	atcatcccac	ttctcagatg	ctcctagaac	tccagcccgg
25141	gatcctttat	cctctgtata	ctccaccttc	tccccataca	agaccctctg	cagagagcag
25201	gcacaaggag	cagataaatg	atgggtcgatg	ctgcctgtca	attcagatgg	gcctggcata
25261	acgggttaact	aatgggtttc	ttgttttgatt	gataggttct	ctcaaaacta	aaggagttaa
25321	atttcttttaa	tagcaataca	tgctcattgt	taaaaactca	tatcaactga	atttcccttg
25381	aacactatta	acatttagtg	tattatcctt	tcacatttgt	atagatattt	agaaaaatgg
25441	agtgtagtat	atacgtttat	atatttttgc	ttagcagtac	atcatagaca	tctatttcat
25501	tatattcaaa	tggctcaata	atattcccct	gtgtagctgt	accataatct	agccaaactc
25561	ctatgtgggg	gcctggtttg	tatttgattt	ttcagtaaYa	taaacaatgc	tgagataaac
25621	ctctatcagc	tagattattt	ctattgactg	attttaatac	atgattggaa	ttttaaccac
25681	aagggggaag	caggcaacca	tgggaagaca	ggctaagatt	taggataaag	aaaaagaggc
25741	tgggtgcagt	ggctcatgcc	tgtaatccca	gcgctttggg	aggggtgaggc	aggaggacag
25801	ctcaagccta	ggagtttgag	gttacacaaa	gctataatca	cactactgca	ctccagcctg
25861	ggtgacagag	caaaaccctc	tctctcaaaa	aaaaaaaaaa	aaaaaaaaaa	cgatttagaa
25921	agttatctca	catacataag	cttaccctca	ccttgtagac	aggtagtagc	attagtatta
25981	gcctcatttt	ttggaggcaa	agctgatgat	ttcattatca	ggcgctcttc	tgtatttcca
26041	aataaattga	cagcagtaca	acattctgcc	tacattcagt	tcaagtccag	gtgctgtgct
26101	ggggacacta	tgaggcatgc	agaaataaag	aagacaatcc	ctgcccctca	gggggtcatt
26161	atcaggtgtg	aggacagaca	cacctaaata	accaagtgcc	cactgtaaca	gacaggagag
26221	cccaggaagg	taggaaattc	acttcgatag	tgaggctggg	cacagtttta	tggaaggggt
26281	atgctgacaa	taagaggtaa	ggtgtattta	gcctttactc	tgtgcatggc	actgtgctaa
26341	gtgctttacc	tgcataatct	cattaaaact	tccccacagg	ccaggcaccg	tggtttatgc
26401	ctgtaatccc	agcactttgg	gaggccaaaa	caagaggatt	gcttaagccc	aggagtttgc
26461	aaccagcctg	ggcaacatag	caggggccctg	tctcttaaaa	acaaaccaac	caaccaacaa
26521	acaaaccaac	aaacaaatcc	ccatagacct	ggaaggatc	ctaccctttt	ttacagagaa
26581	gaaaactgat	ggtcagagag	gttaagaaac	cagctaccgt	ggcacacac	tggaacgcgc
26641	gtccttaaat	tgaattcagg	aggccctaca	aggggtggta	gactttcaac	aggcagggct
26701	gggagagaga	cttctaagag	aggaaacaca	gaaacgaagc	cttagaggca	agaaatacag
26761	gcacgtctgg	gaatggcaag	gggatcagcg	tgcttggggg	gtgaaaaagg	aggaatctga
26821	agagatcaaa	actagagaaa	gaaaactgag	tcagagtggg	gaagactgtg	agtagcagg
26881	caaggagatc	ccgctgtatt	ttgtattcag	gtgaaaccaa	ctgaagataa	tgacatcatg
26941	tgtgctttat	gaggattaat	ttggtgcatt	gcMtaagaga	acaaggagac	tagtttagggg
27001	cttggttaaaa	tagtcctggc	caaagataac	tagcgaagga	atgagaacca	gaagacatta
27061	cagagataaa	atccacaaga	tctttattaga	tgctggggaa	agaggaaaga	attgtgtatta
27121	agattttcat	gtttgggcaa	ccaggagaat	gtgagtgtgt	acaccaggag	aggggctgga
27181	cagaagggag	aggcgagtgc	acttttcttt	tatgagctgg	aaggaccaca	gggacctttg
27241	agtggagatg	tttagaggag	agttagaaac	aggaagctgg	tgatttagac	atagtacctg
27301	agaatcagaa	gaaaccagag	gcccgggtgtg	gtgtctcacg	cctgtaatcc	tagcactttg
27361	ggaggccaag	atgggagggc	tgcttgaggc	caggagttca	agaccagcct	ggtcaacata
27421	gtaagaccct	ctctatatag	aataaaaata	aatttaaaaa	aagaagaagg	ctgggtgcag
27481	tggtctcacac	ctgtaatccc	agcacttttag	gaggccgagg	cggtggatca	cctgaggtca
27541	ggagtccaag	accagcctga	tcaacgtggg	gaaacccctg	ctctactaaa	aatacaaaaa
27601	ttagctgggt	gtagtggcag	gtgtctgtaa	tcccacctac	tcaggaggct	gaggcaggag
27661	aatcacttga	acccaagaga	cagtgaacca	agattgcgcc	attgcattcc	aacctgggtg
27721	acagaacgag	actctgtctc	aaaaaaaata	aaaaataaata	aaaagaagaa	gaaatgacca
27781	agggagctgg	ccagggaaaa	acctacactt	aagattcagc	aaggcatgtt	agaccctgat
27841	aacctgcaat	tccacagcca	ggtttctatc	ccagagaaac	aaaatcacac	gtgcacaaga
27901	gagcgtatga	aagttcacag	cagcattgtc	tgtcttgggt	aaagcctggg	tcagggagga
27961	gcaggcfaat	aaaccattaa	acatccacat	tgtgcaatag	ttaccaatta	agtagatcaa
28021	aggtattgac	atggacagat	cttcagaaca	tacagtggat	gagaaaaaca	acatgtagtg
28081	caataataat	gtataaaaca	ttacttatga	aaaaagaaga	aaagccaaac	aatcctgtca
28141	catatatatt	ttaaatgatg	tatgtgtagg	catagagaaa	attctggaaa	gctaaatcca
28201	tgctaattgt	gataaagggg	aggagtgggg	acaaacatga	agagcagaag	gggttaaatg
28261	gggttttagc	atagtgtgca	ggttttaatt	ttataagaaa	aatgtaatca	tctgttactt
28321	atgtgaataa	aaattctcaa	aatattttta	aaaagaagaa	ttcaatggga	agaggaaagc
28381	atggaataga	caggaataca	ttcctagact	ctaggtagga	cactgttact	gggaacactg
28441	ggagaagttt	ctggaaKgca	aggtggaaaa	aggatccact	gcactcagca	acgctgcaga
28501	gacagcagcc	agcaggatga	gtcctgtgag	ctcagctggt	tgtcaacacc	tttcaacttac
28561	agccactagc	tcctgtgtcc	ttgaaaagtc	gccatgtccc	accactgccc	ttgaatgaga

28621	tggagacttt	ctgttctttt	ttgagttgta	aacatccaaa	agcatttcRt	caatttcttg
28681	tatttagaca	ttcccttctt	ttcccagaaa	ttccacagtg	atattctcag	tgttctcttt
28741	ccagtccttc	aagctgtgta	tgaatctac	ttcttcccag	tccagctcca	gcaaatacct
28801	gcctcctctc	ttgttctcca	ttcaaaaaac	ttccaatttg	aggtcatttt	taagagcatt
28861	actgtgggtg	tggtcggtgg	ggagtttata	gaatttctca	tggtgacccac	agcatggatg
28921	tggttaacac	tgactgagca	cacaaagggtg	caggcactgt	gctaacttca	taggaagtat
28981	ctcggttaat	cctttcagca	accccagtag	gtcagtacta	ttataacctc	caaggtcttt
29041	ctttcacagc	tggtgacttag	tggtggctgag	cgacctaaag	aggttaagtgg	cagtaagctt
29101	gtggtgggtg	actctgtggt	tgctcacta	tgtagtttg	tcctaagtga	tcaatagggg
29161	tggtgactgg	actagaaaca	aggtctcagg	tatgcagggg	tggtcagttt	accaaagtgc
29221	tttatgacca	ttaattcatt	tgatgtcacc	acagtgtctt	aatgacatgg	gtcattaggg
29281	aaaataatga	gatgagtcaa	gctttgtaat	tcctttaaag	tggtcaagtc	tggtttaagg
29341	gcttttaggg	cacatttaact	cactatgtcg	tcttgagcaa	ctctgcaagg	ggtgggagca
29401	gagggggccc	cctttggccc	agctctctac	aaatcatcta	gttcctagca	gccactcctc
29461	ctggtctgca	aattcttggc	gaggcacctc	cctgctctcc	aaaccacccc	attccaggcg
29521	atcccttaag	tggtcagagga	gccaggttcc	tggtggttaat	aagcaggctg	tttataagcca
29581	gcagcagtc	cggtgacagc	agctggaagg	tcagtcccct	tctgaatggt	gaggtttctc
29641	ataaacattt	ccccagtgag	ccttctggga	gatgaggatg	actctggggc	cattgccctt
29701	gtcggggcag	agcgccaagg	ccccatactc	actttcttct	cctttctccc	gaatctggct
29761	ctcttctctc	ttcttctctc	ctctctact	ctgctgtcat	tccttccctt	tcttcagtgg
29821	aaagaggaca	cgtttcacag	tagacacaca	ggataactca	accttctgag	cctcagtttc
29881	ctcctgcgta	aatggggtaa	taatgggRcc	ttcatctcag	gatgtaaggg	aaagtgcctt
29941	gcactgtggt	aggcacgcac	agtggacatt	taaaacatat	tggtcatgtc	tttcccctc
30001	cacctatccc	ttttgcccta	atcctggcca	ctgcctgtt	ttctttctat	tttctgtctc
30061	cagccctgct	cccatttcca	ccctgggcac	ttccacccca	ctgaYtgtgc	tgctgtgccc
30121	tggtgaggta	gacgaagaag	ccaggcttca	ttcagaggag	ggctgaccac	cgtagggccc
30181	gcttgccctt	ggcacttccc	catgagaccg	caccctaggc	ctctctgctt	ttagtaaata
30241	gcccatggga	acagggggtg	gagggaggat	gtagaatggg	agaggccaag	acattttaac
30301	ctttggcttc	tatttgccct	taatctggct	cttccaatgg	cttaatgatc	agagatcatt
30361	gtgtaaattg	ctgtgtgact	ttgggcaagt	ccccttcaact	ctctgagctt	cagtgaagtg
30421	tggtgaaggaa	gtgaagagca	gaagtgggt	agaagtgcag	gtcctggaac	cagaccatct
30481	ccaccacttg	ctagcttggg	gtacataact	cctctgtgcc	tcagtttcct	caactataaa
30541	atgcaattta	tagtatacct	aatttataaa	agcactttta	aaagtgtcta	gaatagcgcc
30601	tagcccatag	ttggtactaa	attaatctca	gctattatat	gcaaatggag	aggtagaaca
30661	gggttatgtg	tgcatgagag	gagagctgga	ccttctctga	gggtattcta	Ragtcctgaa
30721	aaccacattt	cctccttttt	ggataagaag	aagacagaac	cttgaacaca	aagtacttct
30781	ccaaggagga	ccataggaaa	cttgtcaaag	acttttaaa	ccagatggac	cccttagagg
30841	tcactctggtc	Yaacttgtca	tgctacagta	agaacagggt	ggaccagaga	gattcggact
30901	tatctgggac	cacagagctt	ttgacgagtt	atagaattgc	aggtggtgca	ttgcagggaa
30961	gggaggcact	ttaagaggac	agtgggatgg	gctgccagag	ggctggtggg	atgctagagg
31021	tcagattccc	aggctccatg	acctccagga	ttcttagttc	aggcacttac	cccataacta
31081	aagcactgat	gtcaccaccg	gcactcttaa	taattataac	catgtaatga	ggagggacta
31141	tatcccaagc	actgcaccag	acgctttcac	atgcattact	tactccatac	aaaatcccct
31201	tgRcaaatga	ggaaacacgc	cttgcccaag	ctgcaacaat	tacaaagggg	cagagctggg
31261	ctttgaatcc	cggctctctc	gatgccaaaa	ccagggttct	catgcaacac	tcttttcatg
31321	tttcccagag	cctagtgtga	ggcttgagcc	tcaataaata	aggatcttgt	atttgtctca
31381	ctgggctggc	caagcagatc	ttgtatttgt	ctgactgggc	tggtccaagcg	ataacactaa
31441	tgaatMagcc	tggtgtcccag	tcacctttcc	agccctttcc	accctgaccc	acaagccatg
31501	atgagagacc	agaccctgtg	taggaaatct	ttcttccagg	ggcctgtcct	ctgtgttate
31561	tgtccccact	gtcaatggga	gaagcagtg	ctgctttcgg	aacaggcagg	ggaggagggc
31621	ttagagcctg	gggtgacRct	tctggctgct	gggcctgacc	tcccagact	ttagccaggg
31681	ccctgacttg	aatgggagga	gcatgaacaa	acagaaagt	gtaggagaag	caagaaacca
31741	ggttaaggta	aaaaaacttt	tcccctccaa	aaatacgaag	tttatagttg	atgtgaattt
31801	gtcaacttaa	tatagtgtaa	gaagcataag	gtttaatacg	gttctctcgc	ccatgtggc
31861	aggaagcaca	tctgttgtat	tcactaccac	atgcttagtg	ccccacccaa	ggcctgtcta
31921	gagtcagtc	tcaataaata	aacatggaaa	atgaatgaaa	aaaaaaaaatg	gagggacata
31981	aggaagagca	ctgaaacatc	cctgcagaaa	cctgcattac	agtttttagc	ttcatggctc
32041	acagcaaccc	ttggacaagt	cacttcggct	ctgtaaacct	cagtttctac	aagtgtaaaa
32101	tagatatcat	ggcagttcct	actgcacagg	gctttgaaat	cacagacttc	cgtaggagtc
32161	atggttccat	aaccacctaa	tgtcaagttg	aaaattgtat	ttcttcagag	tgaggccggc
32221	tttagcaatc	tatgcaaggg	gtcttgctga	accagggccca	gaggaaggcc	agaggtgtgg

32281	ttctaagaat	gaggattaaa	catgagagag	actataaatc	tgcttggaga	accgcagcat
32341	tagggaggga	cagcggacct	ggcaggcatg	acagatactc	tctgccctgg	agagtctcca
32401	gccttgccca	tgcaaggtgt	cagttagtat	cagcgggagc	acagatgggc	ttaaatacaga
32461	agatgtttaca	gattatctag	tccacactgg	acaatagccc	agtgaggggt	taaaggctga
32521	gagacaaaaga	cccagatatt	ctaattccca	gctcaatgct	actcttccca	caccaccatc
32581	aaaggagggg	gacggtgggtg	agaggggggt	tttgaagaga	aacagattgg	acaaaggaaat
32641	gaatgcctcc	atgtagcaac	agcttcaaa	gggcttcaga	ataggagata	tcttgttaaa
32701	gaaggaggaa	cgagaggggg	aaatggttaa	aaataacgtc	ttacatccat	gtggattatg
32761	tttccaacta	tatcatgtgt	agttattgca	tgtaaggtag	tatggtggag	agttactgat
32821	ggggcatcag	aaagcccat	tcattaccca	gctctgccat	gtacaagctc	tgcgacctcg
32881	ggcaaactct	ctctctgatc	ctcaaatttt	catgtgaagc	atgaagcaat	agtgccctacc
32941	ccatagacct	atctctggga	ccaggttagg	aaaggggaag	ggagggagggt	tgtatctctc
33001	ctaaaatgct	ctgcaaatgg	gcaacatggc	aaagcggta	caagcaagcg	tgtgaggtag
33061	accRtcactt	agcctttctt	ttcttttttt	tttttaagac	agagtctcgc	tcttgttgcc
33121	caggctagag	tgcaatggca	cgatctcggc	tcactgcaac	ctccacctcc	taggttcaag
33181	tgattttctt	gcctcagcct	cctgagtagc	tgaggattaca	ggcgacgcc	accacaccgg
33241	actaattttt	gtatttttag	tagagatggg	gtttcaccat	gttgccagc	ctggctctga
33301	actcctgaca	tcaggtgatc	cgctgcctt	ggccttccaa	agtgtggga	ttacaggcgt
33361	gagccaccac	gcccagcccc	acttagcctt	tctacgactt	tgatcctca	tctgtaaaat
33421	ggatgtggtg	ggaatcaaat	ataatgcatt	tgagccttt	ggcacagtcc	ctgacacata
33481	caaagcctgc	aacatcctgt	tagttactac	cactagttgg	gtttaaagaa	ttttctcatg
33541	taatcctcac	aataatccta	tgaggttaga	ttattattat	tctcatattg	cagatgggga
33601	aaccaagacc	taaaaagaat	tgcttaccca	aatcaatagc	taattagtag	acagcaagc
33661	caactgaac	ccagatgcc	tatcagatca	ggcaggcaaa	gatcagaatt	agttagtagg
33721	gcaggcagca	gcgggaatgt	ctgtggatgc	cagacaataa	tgacgccaca	aagccagagt
33781	tctggtagct	gcagaggcat	ttccaacttt	aaactctggt	cagtctggag	ctcagtcaga
33841	acaaaccttg	tttcatcttt	gatttaagga	gctgagaaaa	ataagctctg	gaaagagaag
33901	aggggacctt	gtgttccagc	atcatctcgc	ttatttattc	actaggctga	ttgcttKcc
33961	tctctgggcc	tcagtttccc	cagctgtata	tgaaagggtg	aactagatta	atgcttctca
34021	aacttgatg	aggttctgag	tcacctgatg	atcttgtttg	aatgtagatt	ctgattctca
34081	gtaggtctgg	gaaaaagcct	gagattctga	atgtctgacg	agctcccagg	ccatgccagt
34141	gctgcagagc	taaggatcac	tctctgagga	gcaaggaaact	agatcagctt	gaaggacatt
34201	tctggtatga	taatgcctat	gagagcaata	caccaaagac	tgagaagtcg	agcaaaaaaca
34261	aattctgccc	aaagtgcctt	acagtatttg	ggggtccagt	gtgagggcca	ggctatttcc
34321	catggaccac	agaccccttt	aaaaaggggc	ttgatattcca	gcactcagt	aggcattcag
34381	ctcgagggcc	agctctccag	actcttcttc	ccagcccatc	tcccaccctc	acctgcactt
34441	cacctcttaa	agggagagaga	caaaattttc	taagccattt	ccctccccta	tcagggtcgg
34501	ggaggagcgc	gcttgttctt	aatgaagaca	aaggacaagg	cttaaggggc	acttgagaat
34561	cttttctctg	ccttctcttt	cctcatctat	tcattcatte	ttcatatttc	aactatttat
34621	tgagtactct	ctacgtgcct	ggatttctcc	taggggctga	ggttacagca	gagaaaaata
34681	gacagatgtg	gcctctgacc	tcattgttgc	tacattctaa	ttgggaggaa	aatgggacag
34741	gccataaata	ggtagatttt	aaaaatgaat	gagatcatct	aaaatcacaa	aaagcaataa
34801	aagaataaatg	aaacaaagtg	atggggtagg	gggcttcttc	tgtctattgt	cctcaagaca
34861	aagtccaagg	ttggaaaagc	tcattctccac	ctgcccttgt	ttgcttctcc	agcctcatct
34921	cctgtcactt	tttgcttga	actttccatt	ccagccacac	aggacatgga	gtatcaaggc
34981	tggaagacgc	caaccagcct	ttgatccagt	ggttctctca	gccccaatca	ctctttctct
35041	ttgtccctac	ctcttccctc	ttttccctct	ttctcaccca	actaaccctt	cctgctcttt
35101	cccagcttac	tcgccactcc	cactggaagc	tgccctgct	gccactgate	tgggctagga
35161	atccgtctgc	gccaccttcc	cWgatgacag	catccatcac	ctgtgcagcc	gtgttaattg
35221	gctgtccttc	ccccaccaga	ctgtaagtgc	ctcaagggca	ggagtccgtg	cttattcact
35281	ctgaatcctg	aatcctcagc	agttgtgca	atgcaaaagca	cagagttagt	gcttaaggaa
35341	cacctgttga	attaactgac	actaagttaa	gtatatttaa	gagctcagta	atgggctggg
35401	cgcagtggct	cagcctgtga	atcccagcac	tttgggaggc	caaggtgggc	agatcacctg
35461	aggtcagagc	ttcaagacca	gcctggctaa	catggtgaaa	gccgctctct	attaaaaata
35521	caaaaaatta	gctgggtgtg	gtggcagggtg	cctgtaattc	cagctactcg	ggaggctgag
35581	gcaggagaaa	cgcttgaacc	caggaggcgg	aggttgacgt	gagctgagat	agcaccactg
35641	cactccagcc	tgggcgacaa	gagcaaaact	ctgtctcaaa	aaaaaaaaaa	aaaaaaaaag
35701	ctcagtaaca	tgagacaaa	gactctacaa	gacatggctt	tggagacaaa	gaataaattg
35761	ataaattgga	agggaaaagaa	tataacaatt	cctcagtcct	ttctggagtc	cacattctag
35821	tggctttcag	ctctacactg	tatcaggcct	cctacaaggc	ttaccaggca	gactgggag
35881	aaattattga	ccccattca	acagctgggg	aaggtcatgc	ctcagagagg	tgaacctact

```

35941 tcagctgaag ttaccagacc aggtggtggc aaagcatgtc caaagaaagt tagggaccag
36001 agacgtcaga tccaaaccct ccctcttgca ggggatgggg taggggtggg aatctgcaga
36061 ctctgaacta agtgttctag ctcatctcaa actcagaata accatttgag gtaaaccagta
36121 gccatagcca caaaaaaagt agacacatga tttgcccac atccaccttc cccctctaac
36181 ccaattgtcc ctgggcagac cgtgcagagt accaccccat tcgtcctcaa ggactccctg
36241 cctgggggtca actcatgaga aactgtccac ccgcagattg actgggacag aaaaaaccct
36301 agacttttaa tttccttatt tcacagttgg agacaatcca aagcttcgag agaaggaact
36361 agtctatata gcacatactg agacagggtc agaactccgg agtcagaact ttctgaagta
36421 tagcccacaa gtccccttga catgaacctt ttgagttggg aaagggtctaa gaatgatgtg
36481 aacatgacct ggccatttgt tagctgtggg caggctgggg gaagagaggc agcccctctg
36541 gtagtcttac tctagaactc attagtcctc ccagtcctca atggtttgtg cattggtagg
36601 tagcccatgg gaagtaggat gtgggttgc tactgcttag tgactgttta tgaagattgt
36661 tattgtctac acagcagtat agtctccag ctgaacaata acctagaaag tatggagagt
36721 ggccggggcgc agtggtcac ccttgtaatc ccagcacttt gggaggccga ggcaggcgaa
36781 tcacgaagtc aggagtctga gaccagcctg gccaacatgg tgaaaccccg tctctactaa
36841 aaatacaaaa aattagctgg gcatggtggg ggtgcctata atccagcta ctcaaagggc
36901 tgaggcagga gaatcgcttg aacctgggat gcggagggtg cggtagctg agatcatgcc
36961 attgcattcc agcctgggag acagtgcgag acttcgtcgc aaaaaaaaaa aaaagaaaga
37021 aagtatggag agtaggtgga gagggtctag cagagacata ggtagggcac cttaccacta
37081 agaaatagag caaagggtag gtgctttatg ttccagaagc atatagatcc aagaggaggg
37141 aagggacatt ttggctgaaa gcttggaact atatctagca tagataaatg tgattctcat
37201 aggtgcttgt atttgctatg ggaccctgga ccaatcattc agtctcttga agccttagcc
37261 tctcccataa gaggttgga tgagctagtc tctagggatt cttcttttta taactctccc
37321 tctaagtggt ctttcagggc agagggtgag attaatcct gctatggctc gagtgtccc
37381 cctcccgcat attccgatat tgactttttt tttttaagag tctcactctg tctccaggc
37441 tggagtgcag tggcacgatc tcagctcact gcgacctcca actccctggt tcaagcagtt
37501 ctccctgcctc agcctcctga gtagctggga ctacaggcgc acaccaccat gcctggctaa
37561 tttttgtatt ttttagtag aggggtttc accatgttgg tcaggctggt ctggaactcc
37621 tgacctcatg atccgcctgc ctccgectac taaagtgtcg ggaatacagg cgtgagccac
37681 actgcgcctg gctataattga catcttaacc ccaagtgat gctattagga ggtgggaact
37741 tgggaggtga ttaggtcata aaggtggatg gagcactcat gaatggaata aatgccctta
37801 taaaaaaggg ccaagaaagg cccctcaccc catctaccat gtgagggtag agtgagaaga
37861 cagccatgta tgaggaagca ggtcctcacc tgatcccaaa tccctgatct tggactccc
37921 agcctgagaa ctgtaagaaa taaatctgtt atttaccatg caccagttt atagaatttt
37981 attatagagg cccaaacgga ttaagacaac tccatttcag gtaagcccaa caaacctagt
38041 atttgccagg ccaggctctg ttgaggctta attgagaaat gtgtagcaaa ttgttagtag
38101 tacaggcccg agaccatgat ccttagaccg ctacacttgg cctgtggtca gctcttggga
38161 acttctattt cagaaggatt tccaccattc cccaaactaa taagagtagc tcattatgcc
38221 taaactggac aaacaatgca gttctgttg actgcctaat tttctctctg gagttagaa
38281 ttctggtatg tgcttagcca aggatgccta tgtgaccagc ccctaacaaa aNcctggcat
38341 tgagtctcca gtgaacttcc ctggtaaaca acattttaca catgctgtta cagttcattg
38401 acaaaggaat gaagcacatc ctgtgtgctt aattcagctg ggggatgatt ctgggaatct
38461 cgtggctgtt ttcttcagga ctttgtccca tgcaaccttt cctttgtctg attttgtaac
38521 cttgtgctgt aataaatcat agtgtcagtg tacttatatg ctgagttctg tgagtctctc
38581 tagcaaatca ctgaacctag aggtgatctg gggaccccca acaggagtta agcctagatt
38641 tcacagagtc aatcataatc ttgtgccagt cccttaagag tatacagctg aaaccagtgc
38701 tatccaaacag agatataatg tgagtcacat gtaattttac attttctagt ggctatattt
38761 taaaaaacaa aaagaaacag gcaaaactaa ttttaagcac atgttttctt caaccataa
38821 tattattatt cttttatttt tattttcgag acagagtctc actctgtcac ccaggctgga
38881 gtgcagtggg acaatcacca ctcaactcag cctcaatctc ctgggctcca gtgatttgcc
38941 cagctaattt tgaaaatttt tgtagagatg tggctcact atgttgccca ggtggtctc
39001 aaactcctgg gctcaagcca tcctcttacc tcagcctccc aaagcgctgg gattacaggc
39061 gtgagccatt atgctcagc aaccactat attaaaaata tatttaaaat atttccatat
39121 gcaattttat taaattaaaga tttttatat cactaagtct cagaaaaca tcagaaaca
39181 ctgtgtgttt tatactcaca gcacagatca gttgtacta gccctactcc aagcgtgcaa
39241 cagccacaca cgcccatggc ctgcctgcta tattggctta gaggttaatg gcaagggtc
39301 tggagacagt atatgcggag gctaagaca ctctgtctag gatgctgatt caaccagtgt
39361 gattttctgat taactccagt tccaggaaag ccgctaaggt tttcagttta tctactcttc
39421 cttgtgtaag agcatgtcct taacataaat attccctta ggtgaaaaca aacttaatat
39481 tctcacactt cagttggcct acacatccct tcaataggga aatcgccctc tccctatgct
39541 atataagccc tgggtgagg aggggtaata gcttggggat ccactatctc acttcacagc

```

39601	cacctaagac	ttctgtggct	tctgtttcta	agtcacctaat	aaatgtttct	ttctgagaaa
39661	ctgggtatgt	cagcttcttt	cttcagcttc	tcagcctcct	ctgactggct	ggcgcgggg
39721	tggggtaggt	ttacagagat	ctgctcacag	cagaatagta	tgtgtgggtc	agaatcccg
39781	ttctgtgact	taccaactgc	ataaccttaa	gcaaagtgtc	ttaacctctc	tatgtattag
39841	tttcttcatt	tacaaaatgg	ggataataat	gttggtacc	tcaagaggtt	gcagagatta
39901	attaatctaa	ggcagcacct	ggatagata	ggatattgag	tgaatgctgg	ctgctactct
39961	ctttatgcta	aagcttggcc	catggagatc	aacttgtcta	acacctcggt	ccataaatga
40021	gaaaactgca	gcccagagtt	tggaaaggac	tagtttcaca	agcaaaaact	acagccacc
40081	acctctcctc	ttgatgaact	ccctgtcttc	tggctggccc	tgagatcaaa	tttgccaatt
40141	atttaggaaa	ttggcagctc	cagggcccca	gctcgggtct	gcaatttctc	tcgattgcaa
40201	aacaagggct	actgtttgaa	gttggcactg	aagtgaacga	ggctgggctt	cacttctgct
40261	tccacctagg	ctcatcagtt	agagtggctg	atccccatctt	tgagttcaga	acctgaaatg
40321	tttactaacc	aataataaag	ctggctttcg	ttgttttaac	tttttacaat	cctttgagtt
40381	tattaatttg	tgttctatct	tccttgaaga	cacagtgcac	cagcactttt	tgtaaaacct
40441	ctttttaagt	catcttcggt	ctctgttcac	ctaccaagta	ggtaagtagt	gagctcccta
40501	tagaggctct	taaaaaatag	gatgaagagg	ttccgagtgc	tcacttgtct	ggaatgcgga
40561	agacgtgttc	tcagactgga	agcaaaaacta	gcttatgatt	cttctacagc	ttctcttcc
40621	atccctccct	tcccattttg	gccaatgcaa	atcatctact	ctcctctgac	aagcctactc
40681	atcataaccc	gcacgtcttg	aatcttccta	gaagatgaaa	tcagaccagt	cttgcggtct
40741	ctacatgggt	acaacttgct	aacttgaagc	tctccttatt	ctatatgcca	aatattgttt
40801	tccttgacat	taatttattt	gatagatatg	tatcaagcaa	ctactatgta	ttaagctctg
40861	tgctgggtgct	gggtYctttt	tggatcttat	aatttagtgc	agaaaataga	caaacaagaa
40921	atgatgataa	agtacaacaa	agggctcgatg	tacaaagtgt	caaatactct	aggaactaca
40981	ggaaaacaag	ggaaccatca	cgaaacccct	gtcttaagac	gtgacattag	tggagatatg
41041	aaaaatgagt	aggatagtag	cagttaaagg	gagacaacct	ctgttccaag	cacagggaa
41101	agcagagatg	aaacctggaa	gtgagggaga	atggcagact	gcaagaacgg	aaaaatgtcc
41161	agtgtagcgg	aggcagagag	aatatggaga	gtgtggcaaa	agaggaagaa	gcagatggat
41221	tttgagggca	ctttctgaag	tgctaaggaa	tttagacttt	aacctgaggg	caatcagaag
41281	cagcctgggt	gagaacgata	tatttcaaaa	cataggggtcc	ttgaaaacaa	gtcaacccaa
41341	tgtattttaa	aggctgctga	tgaaaagatt	gggaagtatt	gttttcattc	tcattgtttt
41401	cactgtcatg	ctctttgtgc	caatgggttag	acctcctttg	aaagctcact	gcagcatgaa
41461	agcccttctt	aatgccaggg	caggctcccc	aagcctcccc	acccactgt	ccatgtcatc
41521	agttttgtac	tcctgttttg	tatggctcag	gctttcctta	tactcttagg	aatgaaaagc
41581	cacagacacc	accactgaga	gactgtcaaa	gatocttggt	aaaYaggtgg	acaactgaga
41641	tcagagaag	aaagtaattt	tattactttc	Ygtagcaatc	caggggtagc	atctcaggtc
41701	tctggtccct	tcttgtctcc	cctaaagaaa	tagaccacca	gggctgggat	taaggtgaga
41761	caagttagac	atagaggggtg	caaaatgtag	agagatgccc	gctgccaggt	gccagcctgc
41821	acttRtgtga	ccctaggtgc	cttcccttcc	ctcaccctgc	tggtatctgc	tggaaacacc
41881	tttgagagca	gggactttgg	cttttagaca	actctttagc	atctctcatg	gtgttaacat
41941	gttgcttaggt	gcctattttg	agggtcacta	gatgcctact	gataactaatg	aacaatggat
42001	ttctgacaaa	ctgatgtgca	cacagatgtt	tatattttag	ggtaaatacg	aaccttaaaa
42061	gacaacagaa	caacatggag	agggcctgag	actgagtcta	gagacctgga	ttctgtgtcc
42121	ctccctgcca	tcagtgggtt	atgggaactt	ggataaattg	ctcctcatct	ctaggcttca
42181	gggaaatgag	gtggttgaat	aaaacgtatt	gagcacttac	tgtgtgtcag	ccattgttca
42241	tatgctccca	ggctttaact	cagctaaaga	cttccctggc	tctgtgggtt	cttccacttc
42301	aacaggctgt	ggtttgaggt	gggaagactt	cgtagagaat	gcaaaacttg	agagacatct
42361	tccaaattcc	cagggggatg	ttaatacctt	taatcatagt	aaaggtatgg	tttctcaagg
42421	catttcttgg	tcagaagaaa	gttccagaag	gcacttaatc	ctaggactca	cactaccaag
42481	gctacagcca	ggccaactgc	ctcacaataa	ccttagaaca	tgtctgaaga	cagattttca
42541	gcttctgccc	ctagagattc	taatgcagtg	attccaaagt	gggtgccagg	aatctgtatt
42601	aaaggcttcc	cagttgactc	tggtgggtcag	agagatttga	gactgattcc	atcacattcc
42661	ccatctgtga	acgggatcat	acctagacag	cccagcccta	gaactgcctg	gtctgacctt
42721	aaagtgtcca	tggagatttt	gtttttttaa	tgtaatgaat	gattaagtca	gcaaataactt
42781	tacatctctt	gtgtgctagg	ccctgtgcca	gggtgtgatt	atgggcccta	ttctcaagg
42841	actcctggtc	tccgtctgtc	acttacttta	gaaacaagtc	atctagccag	agccagaagg
42901	gactgggaga	tcactaatcm	atcccatcat	tacaYagctg	aggaactga	ggcccagaga
42961	gtaactgcaa	catgttaaag	actacacagg	gagcaaat	Wttttctgct	tYtaagccag
43021	gtgggttggc	cacagatagg	ccaagaagaa	tacgaacaga	caagccttgc	tgggtttccc
43081	actcagttta	ttactattag	accattccct	tttcccccac	tcacatttct	gcgcatttcc
43141	atgggtcttca	tagaatctaa	gcctaaaaat	agagttttcc	ttgagtcttt	gggtcttcat
43201	ttYtgaagac	tctcatgtca	cagaaaactt	taattaaata	aatcgttatg	cttttctctt

```

43261 gctaacccttt ttctacaggc atgtcagctg tgaYYcttat gatggggagg aaaggcacc
43321 caccttctct gtccctacag tccYaattgcc ctaccagaa tggggttttc aaaatcccag
43381 gacaccact cttgtttct taagcactaa acctatatat agtaaatgtt tctggaagt
43441 taacttcagc tcttgctgaa attttaaaacc ctcaatttcc agaggaccat cgccaggtgt
43501 ttttaaaaYc tcgataggaa taagaaatgc tccccagaat ggagacttSc atcagttctW
43561 gggagctatt agccccWtg cctggctgt aatggagacc gctgtgtctg cctccttctg
43621 cactttggag ccaaaagagR aagggaccgc ctcccacgtc cacagggacc tgacttcac
43681 ctctctgccc agatttgctt atgtcactgt cgccccggga cggggagggt gggagctgag
43741 ggcagagctg gcccgccct gaaatcccag ccgctagcg attggctgca aSggtcYcg
43801 cttggccgcg gattggtcac acccgagggc ttgaaagggt gctgggagcg ccggacacct
43861 cagacggagc gtggccagg atcaggcagc ggctcaggcg accctgagtg tgccccacc
43921 ccgcatggc ccggtgctg caggcgtcct gcctgcttcc cctSetcctg gccggttctg
43981 tctcgagag ccggggacaa gagaagtcca aggtgagtga gcctccgggc cggggcccg
44041 gagaaaaaac ctagccctc ggtgtccagc gctcagtga atgcaccct tttcccagg
44101 tccccgccag atgggcaatc ccaggtgctg agagacctcc tgaaccctt tgccgcccc
44161 ctccgcccgc gggacccgc cccgaccgt cgtcgtctcg tagttccatc tgttgagag
44221 ccgagacctg gtgcttcagg cgggcagaaat gactaaggga ggaagggtc tctcccag
44281 ctcgacttt ctccccRctg ccacctcgag Rgtcgcttg ctacatctat gtcacctccg
44341 tgcctgagct gctcccttc agtagggcct aagagggagg gcgtcacaga aaaaaatgcc
44401 cagcgtctgg gtgggtgtg caagtccca gggagagaga caaggagaaa ggagagaggc
44461 agctgggtgg tcctggctc gaagaactgc tgtggggggc tcttctaccc caagaatgat
44521 acaggcaggt agaaatggcc acttggttc agggcattgg tagaaggagg agagatctgt
44581 gctagaaRga gctctggagt gacagtgcag aacactcagg accctgagtc cttacctgt
44641 cctggaccct cgtttctcca tctgcaggg agagtttggg ggtgggagt catggggcac
44701 aatgagctg agggcctcag aggggatgct tggagaagct gaaaaatcca caagctgtt
44761 tctgaaattt cctcYcctg ggcagcctca ctaccagga cccactgtcc tcattagcct
44821 gaggaacctt ggtagtggg gaaagctgg gactgctaatt tcagaagaag aggtagaatt
44881 cctagagcc tcagtctatt tccagcaggt gtgtggccca Yacctggagt ggggactctg
44941 aggccaggag tgggatgacc cagcatgctt atctccttg acagtatgta ctgggtggg
45001 ctctgYagac ctctcctcta ccagggagt gggagtgggt ggggaaggag gcagaagcca
45061 ggtgtaggga tagactcaaa gcgagcgtt tctgtctYca acttcccaac atgcataact
45121 cacattttgg caagctctga gcttttgtt ctaaaatcct ctgggtcttc actttaatta
45181 agttSttatg agtctaggat tccgtttcca aaattctgtc cacttctcag gaagccatt
45241 ggaagcacag ggttcttcc atgttactca ccccttttctg gtctcagcc taaatccgat
45301 taatcagct ctcttggag tcagctctaa tggatgtgaa gccacttctg ccaagtcctc
45361 tcttttttat ccatccctgt tcataatccc caactcagaa ggcattttcc aggtcaggaa
45421 tgggatcgat tttcaacatt gaggtttggg gtgggccata gacaggccag caccRtgag
45481 tcagtcctca ccttcagttt tggaaRggtc aaagaagata caattggggt ctgcctcaag
45541 aaSgctagt gggagaacgt ggaactcag aataactcat catagctgtg tcttctctg
45601 Mgcactctgg ggaaggataa atggactcag agagaatagg atggggatgg tYtagaaaag
45661 ttttaggtg aggtgtgatc atatcacata caaccagtca ggacttgctg gctaattgaaa
45721 gcctgggcat gccatctct gctcccaagt tcttaNagtt cagatgtctt agctctgggt
45781 taggacccaa ccactcacct taccccaac ccagggtaa agagaYagg ttatggggca
45841 tgtggagaat ggaatggagc aaaggtgact cagcccaga gaggtgtttt cctcctacca
45901 attgaaaggg agatgctagg gaagagacca ggtcctcctc ttcttgctgc gtcacctccc
45961 cagtcctaac tcaSgctgcc cacgtcctt gtctctacaa aaggactgca gaagccggaa
46021 agagtgcaca ctgctgacgt gcaYgggatc ctagtaactg ctggtttcta ggtgactaaa
46081 cctggcagag agaatcatgg aaccacaggc tgacagagtt aaagggccct taagacagcc
46141 ctgaacctga ctcatctta caatggagga gctggagccc cagcaaaggg ggtcacatgS
46201 catcagagac acagcaaRgc Ycagactca ggtctcctga ctcccagacc acttctcaca
46261 gcatcatatt gataggagtR ataagacggg agaggagaaa gacacaagac cagcagcccc
46321 agccagccag agtctctgNct gagtcccatc atccaactct caagccattg gaacctctt
46381 ctcttgccc gctgtgggag gattcaggca cctcatggc ctctccctt atctcctctg
46441 'gccatgttt cagatgcggt gctctgggat tccaagtgc cagagaaggg aagggggctc
46501 atagaggact gagttgcagt gatcagtggg gaggcacagc gtggctctcc acccatgggc
46561 cacttctga cccccactat ccYttgacat gagatttctg tccaagagac tccaggcctg
46621 tttgtctct ccagcagatt cccacaaccR ttttggcag cagcatgctt atctccctgg
46681 acatatgccc agacagtgtg agtgacttgc tcagggccac Rcagccagca aaaaatagaa
46741 cctaataaaa taggtttctc cttgccacac cccaagctg aaactgtgcc cagaagctgg
46801 tccttctStt tacaagttcc cattattagg acaacctgta atctttttt cctccatgtc
46861 tcagagttca tttttggatc atggcagagt taaaaaagtg gagaggctat agacatgcct

```

46921	ggctttctgg	ccactagatc	tttggggcgg	tctaggggtg	atttgttgtg	ccccagtttg
46981	tctgcatttt	aaggcggaac	tggccctggc	tgggaacgag	gagggtccagg	agcagtagga
47041	atgttgatct	taggtcttgg	gactgcctcc	agcaccacc	aaaagtcacc	ggatgtggaa
47101	tattagactc	atgtaaagca	ggaagtttgc	accagagcca	agaagagagc	ttgcagctgc
47161	caggggaatg	cctggcgag	gaagcgagc	ctcgccagc	tcagcagacc	tgcttcacga
47221	cagagcgagc	tcttctgcac	tMtactgggg	ccacgacctg	ccagcatata	tcactccctt
47281	cacctgggtca	ggcccaggtg	ccttgcctca	acagcaagtt	ctccagaatt	gaggggaaga
47341	gagggagtg	atttgcctct	ctaactccag	ccacctgtct	ctgcccctctc	ctggtctata
47401	atgctacttt	gcattccatt	tggtttattgt	ctgcccacct	ctcaaaggat	atcagggcca
47461	caaaggacct	taaagaccac	cttatacaat	ggtttcaagg	tttctccttt	cYcatcacga
47521	ccagcccacc	tgccaaattg	tgtaaatgat	gcaatgacat	cctttcaaga	atagtctcag
47581	aattttgttg	tctgtgtcaY	gggcagagta	ggctcatagg	ccacatccta	ctagccagca
47641	gtgaccctaa	tcccctctct	cccactgac	atgatcctat	caagccatca	tggttgacct
47701	gggttRagag	ttgggttcagt	tcaaggttct	cattttataa	atgaggaaac	tcaggtccga
47761	agaaaagaaa	gggccagtc	aagaccacac	agggagttaa	tggaRaggg	acatggagcc
47821	caggtctccc	agcccacagt	ccactgcact	ctgtccctcc	ttgtctctga	ggctgactgt
47881	gagcagcagc	tggggaggga	ggaaggcata	agggctcatca	ccagcctgct	cagaccggga
47941	acattaacac	atgcaggtac	tggtgctttt	ccctaccKca	ccacagccct	ttccccatg
48001	cctggctctc	agtcctgctt	YcctRtttgg	taacaacagc	tcctctcttc	ctgtctctga
48061	gattgggagc	ctctgaatca	ccatgtccat	acKgcctctt	cctcctttct	gttcagtttt
48121	tccttcacac	tgccctagtt	caggttctca	tcctcaattg	cctggattat	tccaacagcc
48181	acccaaccag	tctccatcag	cccgtctagg	aaccagtc	tcagctttag	ggcagttctc
48241	ctgagagccc	agtaaatgtt	ctgaaattga	catgtgatgt	ggaagtaatt	agcaaaataa
48301	gtcattctcc	agggttccat	agcactcact	tattaagtgc	ttaattataa	taagtgtcta
48361	ttaggtgctt	aatattaata	agtgtctttt	aagcacttaa	tattaagtac	ccRaaaagca
48421	cttattaagt	gctttcataa	tcattatctt	aaacaaggaa	ttaggagacg	tcagtgtctag
48481	tccagttcca	attctcgggtg	attactttga	gaaagtcact	ctctctgttg	ggatctttca
48541	ttcttttgaa	aacggagatg	tccaagttcc	tttccagctc	taactgtctc	ttttatggcc
48601	tgtgttccag	atggactgcc	atggtggcat	aagtggcacc	atttacgagt	acggagccct
48661	caccattgat	ggggaggagt	acatcccctt	caagcagtat	gctggcfaat	acgtcctctt
48721	tgtaaacgtg	gccagctact	gaggcctgac	gggccagtac	attggtaaga	gcccaccctt
48781	cctccctgct	ttatttgggg	ctgtatggca	tatttcaatc	acaggagctt	ttctgggtga
48841	tgggggaaag	ggtgatggca	atcacgagag	tccaagcccc	ttttctcagc	tccactgtgt
48901	tccgtgggtt	tgtgaagatg	attatataag	ccYgaggtct	gattgccttt	ggacatgttc
48961	taggagattc	ctagttatcc	ttcttcatct	ctgggcacct	caacaaccct	aaaggcagag
49021	ggatagagat	taggtttgtg	cttagagctc	cctttggctg	gagcatgaga	tggttaactg
49081	agctccatct	tgtgaSaatt	atctYatttt	ccctcagccc	catctgcttt	ggtgcttctc
49141	ttggcagctc	tctggaaagc	aggcaattgc	ctcgaggccc	cagagtgtat	gcgtgggtga
49201	gcgggagtaa	ggagcaggct	acacttctaa	tgccattctt	aaaataaact	ttgaagtga
49261	tctagtttag	ccttcccctc	ttctcaatct	acacatggga	aaaccaagact	cagagcgaag
49321	atacaactta	aacagggtca	caaagctatt	agcgttgga	tggggcattt	ggcgaggtt
49381	tcattgatctc	ctgatatgct	tactcctttc	tccctagctg	gggtagaata	cagaggctag
49441	gggaacaggc	aaccaaaggc	aagcgacagc	acccaaggga	aaacgctttg	gggctgagca
49501	gtctactggc	aggggggtcag	ggaggcaagg	gcaatttgac	cctccatgct	ctgcctggca
49561	atcacaggcR	aattcccggg	agtgaagga	Yggcggtcac	gtggcccagt	ggctgtgagt
49621	gctttttctg	ggatgcttct	ctctagcctt	ggaacagagc	agagtgcgtt	tgggcaagag
49681	atgggctggg	tgtgtgctga	aaaSWgacca	ggggacactg	aggaaaactgg	ggagctgggc
49741	cagggcctca	tctgtgttcc	tgatttgcca	aagattatgg	gagggttgta	acctcacYcc
49801	aaagaagttc	tctgccttgt	atccagggat	ggatagttct	tgctccagaa	aactcaatcc
49861	tgagggttct	gaatgagtgc	tctagctggc	ccaggtggag	ggccttggca	atgggcagggt
49921	gactgacagc	tgacttgagg	aagggtatta	ttcttgcctt	ccaaacctcc	aatccatcca
49981	gattagagtc	aagaggatag	gacctgagtc	ccagcattgc	tggtgaactca	ctggtgatcc
50041	tgcgcaagtc	cctccccttc	tcgggcctca	gtagtccag	cRgcacagcg	ggtgagccgg
50101	gggagtggtg	tggtatgagc	agggctcctc	gccaggatac	tcccacRtct	gctctttctc
50161	tttggcccag	aactgaatgc	actacaggaa	gagcttgac	cattcgggtct	ggtcattctg
50221	ggctttccct	gcaaccaatt	tggaacacag	gaaccaggag	agaactcaga	gatccttctc
50281	accctcaagt	gagtaactac	tcagcatcct	gagaaagctc	ctctcacatg	gcccacatct
50341	tggtatcaac	cccaaWtcat	ggtggacatt	tatcgccac	caagaactac	tctcctcttc
50401	taggatcccc	agtggaatga	gggaaggga	gggacaagag	agggagaagg	acagggacaa
50461	ctggttgtga	tgtgcatccg	cagggagcac	caaggttgag	ggacactgaa	aaaggaccag
50521	gctagaaagg	aagaccgtgg	actcacatta	tgccatggcc	cactgcacat	tcactggctc

```

50581 ctgctgcccc ctgcagaata aatccagact cccaacaccc tctccctgt tctgtccctt
50641 cctctcattt ctgagccctg tgcccacctc ctggggaccc acctaaagaac atttctcaac
50701 aggtatgtcc gaccaggtgg aggcYttgtc cctaatttcc agctctttga gaaaggggat
50761 gtcaatggag agaaagagca gaaattctac actttcctaa aggtaatga gctgccacct
50821 gtgctggctg gggctgcagc ccctcctggc tccagccac agcgtcaggg cccatgcccac
50881 ctcccctgct cctgggctct tggggaattt ctggcacct gactattgtt ccaactagag
50941 ggctctgcag accctgacta gggctctMtt ggccatttt acagaaaggc ccagaaggac
51001 ccagagtga cactactaagg gtctcacMt ctctagagc cacagctggc gctggcagtc
51061 ttctaactcc caaactgggg ctcttYtctc agggccaggc tattccccag ctgctctaga
51121 gaaggaagag ggtcaggggg cctcaagcaa ggttgacact cctctYatcc ctgctctaga
51181 actcctgtcc tcccacctcg gagctcctgg gtacatctga ccgctcttc tgggaaccca
51241 tgaaggttca cgacatccgc tggaaactttg agaagttcct ggtggggcca gatggtatac
51301 ccatcatgctg ctggcaccac cggaccacgg tcagcaacgt caagatggac atcctgtcct
51361 acatgaggcg gcaggcagcc ctgggggtca agaggaagta actgaaggcc gtctcatccc
51421 atgtccacca ttagggggag ggactttgtt caggaagaaa tccgtgtctc caaccacact
51481 atctacccat caYagacccc ttctctatca ctcaaggccc cagcctggca caaatggaKg
51541 catacagttc tgtgtactgc cRggcatgtg ggtgtgggtg catgtgggtg tttacacaca
51601 tgcctacagg tatgctgat tgtgtgtgtg tgcattgggtg tacaRccaYR tgtctRYcta
51661 tgtgtctttc tgggaatgtg taccatctgt gtgctgcag ctgtgtagtg ctggacagtg
51721 acaacccttt ctctccagtt ctccactcca atgataatag ttacttaca cctaaaccca
51781 aaggaaaaaa cagctctagg tccaattgtt ctgctctaac tgatacctca acctgggggc
51841 cagcatctcc cactgcctcc aaatattagt aactatgact gacgtcccca gaagtctctg
51901 ggtctaccac actccccaac cccccactcc tacttctctga agggccctcc caaggctaca
51961 tccccacccc acagttctcc ctgagagaga tcaacctccc tgagatcaRc caaggcagat
52021 gtgacagcaa gggccacgga gggcctggca ggggtggcgt cttcatgagg gagggcccca
52081 aagcccttgt gggcggacct cccctgagcc tgtctgaggg gccagccctt agtgcatcca
52141 ggMtaaggcc cctgggcagg gatgccaccc ctgctccttc ggaggacgtg ccctcacccc
52201 tcactggctc actggcttga gactcacccc gtctgccag taaaagcctt tctgacag
52261 ctgagcctac tgtgtgtggt gcttcttcaa tgggtggcgc ccccgcttg gtgggaagtg
52321 aggaggagaa ggtggggcag ggtaaaggSg ggaggatgag aaaagaacaa atatgacaac
52381 aaaaactttt tacagtgggt gcaaaggtaa ttgcggtttt Ygccatatgg caaaatccaa
52441 ggtctacctc ccaccccaca attctccctg agatcagcca aggcagactg caaggccat
52501 gtacgccctat taggggtggc atcttcatga gRaggcccc cctgccacaa aaaaggggca
52561 aaaattgcaa ttactttttc aacaacctga tagttagctg cagtggcgca ctcttcagc
52621 tacttgggag actgatgtgg gaggtccctc tgagcccggg agtttgaggc tatagtgtgc
52681 cRtgactgag tctgtgaaga gccactgcac tccagctgg gcaacacagt cagactgtct
52741 cttaaaaaaa aaaaaaaaaa aagagagaaa ttagacaatg ctttgagtcc ctgctttttg
52801 gctcctacct tggccacctc tgcttctctc actcagcatt tggagtttat aaaaccagtt
52861 ctgatctact ctcatctcc cccacagttc tccaagttag ctgaggttaa gatgaggtgt
52921 tctgtttgac ggatgaggaa actgaggctc acagaagggc cacgccttgc cccaggtctc
52981 ctgatgagtg aggggcagga ctggaattta aacccaagtc ccttgagtcc tggcctaggc
53041 tcttccact gcccggYtg cctaccctc agggaggccc tgatacgtca ccattactca
53101 agagttaatg tgaccatctc agggaaaagg aacagaagga gggaccagg
53161 aaagcagggg gttgacaggg gaacatYagc gcataaatga acatgagtca gaatgttgat
53221 cttcttcaac ttggatttat gtccatgatt cgtgcaataa gctatccagg gatggacagc
53281 caccctaate tgggcttctg gcaccacagg cctccagcta tggggtccag ggtctgaacc
53341 tcagggcctg gcagcttcag gctggcgccc ctggcRgac gtggctggca tggccttctc
53401 ccatctgtga tggcttcagc aaggctactg tgagtgttg tggagagggc cccagagcca
53461 gaatatccat cattctcttc tgttctggag acaaaccac acttcccaca gctcctcaca
53521 gaggggtagg ggtgtgcgtg gggcaggtcc tgctacagag cttgaagcaa aaattaaaca
53581 cacacacaaa ttggtcatgg caactagagg gcctgaaacc acttccggga ggttttgaag
53641 gaaggggggtc ttggctgcct cccactctta ggattgctgc tcctggaggc ttctgcaaYg
53701 gatggtgggt caaagccgga tgaggcctct ctccactcag cagcagggaa ggagtttttc
53761 ccagctcact ccagcagagt acaaatgaaa gccttctggg tggagcctcc ccagctctgt
53821 aaacagctca gttcagggac tgggtRtaaa gctggccacc catctcagcc tctcatccag
53881 ctgaggctct ggccacaccg tgcaagtggc ttctagtttY ttggcaatMt gagatcagct
53941 ggtcttgcaa gatgaagggt gagccaaatg acacaatctg gtctcactga ggccctcac
54001 ggtcattttt tggagactct aaataaaaca aaattttgag gacttcatga ttatgtgta
54061 gagcgagttt caaagtctct tatggaatgc agtgcaggaa cagtgaat aacagctagg
54121 gttactgggt gctaccaagt gccagggtat agtaccttaa gtacgtggg catgtaatct
54181 tcacccagcc ctatgaagaa ggcaggttat tatccattg taaaagagg aactgggaca

```

54241	ctaagaggtt	ttaaatgact	tgctcatagt	tccaggtcca	ggaaatagt	gggctaggat
54301	ttgaacccaa	tctcaaatcc	tggagcagtt	ctggggaggg	agccccctcc	attataccaa
54361	tctctaccac	tcatcaaagc	agcctccaag	gggctccact	gaacttgtag	ggttcttcag
54421	ggaaaaacag	aaaatgactg	agcagcccaa	tcccttcttc	caatcaccaa	atcctccaaa
54481	ctgcaacccc	tccaaggtgt	ccgtcccatg	gcctctactc	acacacctgc	aaaggagcac
54541	tcgccacctc	ccagagctgg	ctccatttct	gcacaactgt	gtcccttaga	aagaaagtct
54601	ctcttcatgt	tgcatgggac	ttggcctccc	tgctattccc	accactagt	tataattctg
54661	ttcccagaag	ttcccacaggc	gaggtggtgc	cttggtgccc	atgagagctc	tacagggagc
54721	aatggcagtc	gctaagggtcc	caatcttttc	acgagtggac	acagctccag	gctcttcagc
54781	ctttcatggt	ggacaccatg	gtcaggggag	cttttcaaac	agaaatatgg	tcatgccact
54841	ctgctttaa	aatgtccagt	gactacacat	tatgctgagg	ataagacca	ggcctcccac
54901	catgctccgc	aggcctgcac	ggtcaggacc	cggctacgtc	ctgaaccctg	cgttgcccct
54961	ctctttccct	acctgtttct	tggtccagc	cacgtggtc	ttccctccga	tcctcaaatc
55021	agctccccta	cttcccctcc	tcccaccacg	gcctctgcat	ttgtcatggt	ctctgcaaaa
55081	gcatacctca	ccccctacctc	tccacctagc	tagtgctact	cattctgaga	gtctcaactc
55141	aaatgctgcc	cccccggtct	aggctcggtt	cctctgctat	ctgctcccac	agaaaccggc
55201	ttcttcttct	ttagggcact	tgagtgcagc	ctgtttgtgt	gggtttgtgt	tattcatttc
55261	tgctccctc	attagacatt	acgctgtata	agggaagga	ctgtatctgc	ttctgttctc
55321	taggcatcca	tagcacctag	cacaatgcct	ggcattagat	aatgcactag	aatgaatggt
55381	ttcagccccc	ctcactctgt	ggttgccatt	actctccatt	caacactggt	ttggaaagct
55441	gggcctctcc	tccaccaaga	gcagaaaacta	acRacatcac	ccccaaactc	aggcaatgct
55501	ggcagataag	atattatctc	ccccagggag	gaccaagact	cagtattagg	ggctcacctg
55561	gttctgtagg	cctggtctgtg	ggaggttcca	tcacttggga	gctctgattt	ggatttcgaa
55621	ccccctccca	gggtagacgc	caggtgtatt	ccggctgcga	caaaaactggt	gcttaataat
55681	caataatcaY	acccaaaaat	tacaatagca	cctactgtgc	caggacaata	ctaaatctgt
55741	attagtcaag	tataattgaa	tctttataac	aacccaggct	ggcactccca	tttcacaggt
55801	aaggaatctg	aggctcagag	gggataactt	gctgaaggte	atctagcaar	gagaatggct
55861	aaqcttggat	ttgaatccag	gtctttgttaa	atccagagcc	aatctcttaa	gcgccatact
55921	atatactctg	gtgtttaaag	atgtgtacca	agaagggtca	tatgggagaa	gctgaaaaag
55981	agggcagcca	ggaggtttct	gtaatggtcc	aggggagagc	tggtatgcct	aaggtggggc
56041	tgtggcagag	gactggggaa	aatgggacaa	gtgacagcag	atctttggaa	gaagaatgat
56101	aagaagggaa	aagaggccag	gcgcagtggc	tcacgcctgt	aatcctagca	ctttgggagg
56161	ccaaggcggg	tggatcacct	gaggtcagga	gttcaagacc	agcctggcca	atatggagaa
56221	accccgctct	tacccaaaaat	acaaaaaatt	accgggcgtg	gtggtgcatg	cctgtaatcc
56281	cagctacttg	ggaggtctaag	gcagggaat	agcttgaacc	tgggaggcag	aggttgcaat
56341	gagccagatc	cgtatcactg	cactccagca	tgggcacaaa	agagtgaat	tccatctcaa
56401	aaaaaaaaaa	aaaaaaaggaa	aagaaaaata	aaaaagagag	gagagaagaa	gaggaggggg
56461	ggggagagga	gcggagggga	ggggagggga	gaggaaagga	aaggaaagag	agagaaacat
56521	ggtgaggtcg	tggaacctag	ttacacgtgg	aagttataag	aaaaagcaaa	cccaactctc
56581	gatacccatg	gcctggggcc	tggagggagt	cctccttccc	accctgcact	cttactcagc
56641	cttctccgtc	ctagaccagt	gaccctgaac	agctgtgggg	cagccctgcg	ggactgtggc
56701	cagatccctg	ccctgggta	gcagcccaga	gccaggccct	ggacacccac	ctgccaccac
56761	Rgtgctgttt	agttcagaag	gatgcagttt	ctgaacccct	cacttaacct	tcctctctgg
56821	aaggtgtctg	gggcagcctS	tgtgtgtgcc	ctggagcaag	ggagggacac	agactcacca
56881	gatggaagag	gcgcaggttg	gggagtgggg	gcgggtgctc	catggccatg	gggggagggg
56941	ggtagcggat	ctgggaccag	tcctcgaagc	catggtgtgg	caccatggct	ggcatgggcr
57001	ggtaggcgta	ggggtaggcc	ccgcagagat	gttctgggtg	gggctccaca	tggtaacgct
57061	ctcctgaggg	ctgcaagaaa	ggctgacgtc	tggctttggc	ctgcaacagg	ctgcaMagga
57121	cacccatctc	atcacccctc	aaatagaatg	ttagctctct	gaaggctagc	aggctgggta
57181	ccaaaggctg	gtatgtggtc	atgaaaggct	gctacatggg	tacagaaatc	tggtatcatg
57241	ggcatagaag	gctggatata	tgagcatgga	aggctgcatg	ggcatggaag	gctgggtaca
57301	catgcatgga	aggttgtgac	atgggcacag	aaggctggtg	catgggcacg	gaaggctggg
57361	acatgggcat	ggaaggctag	tacatgggca	cgaaggctg	gtacatgggc	acggaaggct
57421	ggtacatggg	cacagaaggc	tagtacctgg	gcatggaaaag	ctggtacatg	ggcatggaaag
57481	gctggtacat	ggacacggaa	ggctggtaca	tgggcacgga	aagctagtac	atgggcacag
57541	aaggctgcta	catgggcagt	gaaggctggt	acatgggcac	agaaggctag	gtacatgggc
57601	agtgaaggct	ggtacataga	cacggaaggc	tggtacatgg	gcacggaagg	ctagaacctg
57661	ggcacagaag	gctggtacat	gggcacggaa	ggctgggtac	atgggcacgg	aaggctgggc
57721	acatgggcat	ggaaggctgg	gcacatgggc	acagaaggct	catacatggg	cacggaaggc
57781	tgggtaaatg	gacacagaag	gctgggcaca	tgggcacgga	aggctgatag	atggaaacgg
57841	aaggctgagc	acatgggcac	ggaaggctgg	tacatggaca	cggaaaggctg	gtacatgggc

```

57901 atggaaggct gggcatgggc acaaaaggct gggcatgggc acaaaaggct ggtacatggg
57961 caccgagggc tggaacatgg gcatagaaag ttggatacat gggcacggaa ggctcataca
58021 cggccaaaga aggctagtca catgggcacg gaaggttgct acctggacac agaattgtcaa
58081 cagtgatgac agctaataca ttgtgggcac tgcctctgta ccaatactgc tctaaggctt
58141 ttctgtatt actcatcagt tagttagcag aggatgtccc cagccccgag cacacactgt
58201 gcatccatca ggctagctcc atgaggaagg taagaggatg tcagtgtctg tacctccctc
58261 aagcctcctc acctttgctt tcctcttctg ctgtctgagg gcttctcttg ccttctcctc
58321 atctttgaat gcttttagct gagagaagaa gggagggaga aaagactgtc ggcacagggtg
58381 gtttctggcc aggcctggat ccaggcccta accagccaMR aggactgacc ggctgatgct
58441 tccctctggg ccaccatgcg tggggcagcc ccgggaaagg gccctgaggg cggagcacag
58501 ccaggcgtgt tgcctcaggg cacctgcttg tcacagtggg ctgtgcacag gtcaagaggg
58561 ttcacgtgaa cctcgtctgct tctctgctaa catcttttag ttccactctg ggagagttaa
58621 gccagaaact gactgtggaag agtcagagg agagatatct tagagtaaaa ctcgtaattg
58681 taaaaagaaa gagtacagaga ggggaagggc ctgtccgagc tcaaatatga ttgcagagct
58741 ggagagaagc agtgagggtc ctgacatcca gcctcaccag ggcctcccaa tccatgcccc
58801 ctctcccSac gaggacaggc cagttgcccc tcctgggtcc agtcactctt acctgggcat
58861 ttgacagggt gacctgggccc tgcagcttct ccacttgctt ctccaRctct tcttctcctc
58921 cattcatgcg ctacgatca ctgctgctccc tctggaagtc ctctcgaag atcttcacct
58981 ggtgtggagg gaggtggaag agagggaggg ggatggctct gagtggggat ttctcctcag
59041 gcccagaYtc ccatgcctcc tgcctgggtc acagatggca gactggggg tcgccatggg
59101 gagtgggaca gctacacctc cagcctccac cttaacttca aacagagtag ttctgtgtcc
59161 ctctatctta cattctgggc ttcaagStag gactttattt gaacaaagga tatatggttt
59221 taaaaaaacg ttgaaagcca tcaaccagtg caatccttcc actccgctga gacccacagg
59281 ggcagtgtac acagaaccag agtgtgtgtg agaccagagt ttggatctgc tggttctgag
59341 ggcagagacc ctacaaactc Ygctagggtc ccagggtgcc ctggcagagg tgggttgggt
59401 ggggcctgcc tctgtctctt agcctgtagt ttcacatcct tagtcagat cagctagagc
59461 actggctagg ttcaaggcag tttaggagga ttaaatagca cagagacaat gggagagcca
59521 caaccttttc gctttcttcc accccaatcc ttctgtgtcc ctacaggcta gtaggcttct
59581 aataccattt tagtacctgc caatctcctt taaataaagg agaaaagaac tccagttcag
59641 agtcttcatt tggcaagagt atccggctag agtttaataa cattgttctg tttttatgt
59701 ttattgcgta cagttaactt ctacttgtga caaataataa atggtttttt ccaattacag
59761 cagtgtatata aagctccctt ttaaattcat ttatttagaa tttatttttt aaatactagg
59821 taaataatag cacgtgtggg gcatagagat ggctaaatca taaagggtgg agaggaaacga
59881 cttaagctag ggttatggtg ctggaaagga taaacctaga gccagtgggg ggccctggcc
59941 aatggccaga aagtggatta ctaattacag gttccatgtg attccaagcc gtctgggccc
60001 tcaggaaaagc tccagctccc acagagcacc tcccacctga tttcctcccg gaagcctcac
60061 ctgctgtttc agcaactcat tctgctgac cagctcctgt ttcttagga gggccctgc
60121 tccttctggg ctcccaaatg ctgtgtgtgg agatgatggc ggggtttgga tgctcagtgc
60181 ttctccagag gcctggaatc aggaaaaagt gggaccatca gcaggaaacc ctggaatca
60241 gggccctttg gaggggtcat cctcagggaa ctcccttcta ataataatca tactaataat
60301 agccaccact accagtctta ttttaataat gctgccctat ttatttgcac tctacacata
60361 tcatttcatt ggatcttctg cacagtgcga tgaagaaaag actatgatca tcactctcat
60421 tttacagatg tgaaaactga ggctcagaga cctgaagggg cttgtccaaag gtcaagggtca
60481 cacagctagt aagtggcaga gcacagatc aagcccagca catgctccta cccagcaggc
60541 taaactgggg ttgtcatgca gaaggggaaa cctccccttc cctgaacatg tgtggctcaa
60601 ttcttagcac ccagacctag aaggaagatt aagtcctccg ggggaagctt cagtctccc
60661 aacaactgcc ctgccctgag attcttactt ttcagcaacc cattcccatc caaacaccc
60721 cttccatcct caaacttat gtacatagag aagactggat ttaatttctg cttagttaat
60781 attttccctt tctaactctg aaaatgggct gaaatatcat caaataacat ttgaaaata
60841 aaaaaatact cttaacttat catgtttcaca atagattata taaacagtgt gccacatct
60901 tcttaagggt ttcatgtaac cgtgtttccc cttaactct gttaacatgt tactcagaac
60961 tctggaacat gtctcaagac tgggcacctt ggactttggc cccaggacag catcgcccat
61021 gggcctccct ggaccgaggg gagatagaga cctggcccaa cttggactcg ggcttccacc
61081 tggctctctc agctccccta gacacgcaaa gaaactgcag gaccgagagt aaattcagga
61141 tgctccgagg ggaagttagt gctccacttt atcttcttac tccacccac ttttaaatga
61201 aaagactgag gtccagcRac agggagatgc ctaggctatg agcaaaagag gccacatgcc
61261 ctgcattact catccacatg gtgtctgttc ctggctctgc caagaaaacc tccaagggtca
61321 tctttatgat cagcaacatg gacaattctc tgcctggatt tagagcccca agtccccag
61381 ctcaggacag atcgcttttc tttctctgga aacagggtcaa gggcccccaga cttggcataa
61441 tcagtgttta caaaacacca aaacaaaaaa gaaagggttt ccccagcagg cctaggaatg
61501 ctcaactcat gccagagtcc actgtcacca ggttcaggag gcagagggaa agggaaaaaca

```


61561	attagcacga	aacgaaaagc	tgagccatga	acttaactcc	tccaggccct	cagagaatgt
61621	ttcctttcaa	agctccctcc	tgtagccttg	catctttgaa	atgtgctgga	aagcaggcag
61681	aactagagcc	gttcccaccN	gggctcggat	ggcaaaactg	aactggagag	gctggagagg
61741	ctaagctggg	actagaccac	tccgcttggc	tcagaccaga	gggtttcttg	tttctcagc
61801	ctctaccctg	ggggcccat	ctccctggat	cccatgcac	aaggcgggc	ccctcagccc
61861	gtgctcctcc	actcccatca	gtgtttgctg	aacatgtgct	tgatgccagg	cgctgtacaa
61921	ggcggccagg	gtatacacct	tggtgaaagt	atgcacctcc	caccaccaga	tggaagaca
61981	gaattaaata	agtgtgacg	agccatgaga	aggagtgtca	gagaagtgtc	tggtacctca
62041	ggagcataga	ccagggcaac	ctgaatgaga	ttctgggaag	gctttgctga	gcaagtgagg
62101	gtaaaacaaa	ccctgacaag	cagggtgggc	agggtaggca	caagggaag	agtgcacctc
62161	cagagggaag	ggtgacacag	gctaattcaa	gggctgagtc	actcccagtg	tgaggaggcaa
62221	tggcagagca	ggcgggaaac	aggatgccag	ctcactgact	gggggttacc	cttcctaagc
62281	tgaatgggtR	gggggtgccag	tgatggggtg	ggcattgcag	ctggactcaa	gggagcccag
62341	ccaagggacc	cgggccaagg	caccacacct	gttgagccgc	tggtatctct	tttctcggtta
62401	ctcagctgtg	cggtgtgagtg	ggctcagctg	atcctgcagg	tacttgacct	tttggcgag
62461	ctccttgggc	tctgctgtca	gctgctcctt	gtcggctctg	agggaataca	aggttggtaa
62521	gctggctagg	atggcctctc	caggaggcct	cggattctct	gtcctgcctg	gcccagccct
62581	tacgttctcc	cctggyCate	acttcacaat	gctcacatgc	aaagcacctg	gggtcggtag
62641	agtaatgtcc	atccggtcct	gccctcaatt	attatgtgtc	aatttaaaat	aataattaaa
62701	aaaagaaaaa	gcagtagctc	agttgagtaa	aagacctgg	attccgacac	cagttcatcc
62761	actaagcagc	tgagaccctc	ggcactgcca	cagccctctc	ttgtctaagc	ttacctacct
62821	gtcacaggtg	cggggttcct	aacgtgagtc	acacagagac	ctcaggaggc	ctgtgagccc
62881	caaaactgaa	tgcgaaattt	tggtgtgtgt	aatctgtctg	aaagaaaagc	catagttctg
62941	accagattca	catgggggtc	ttccgtgac	cacagaaagc	gataaactac	ggataatccc
63001	taacagacac	tgacgtctcat	acagccttgg	agcctagagg	agagatgaca	cgcccagaga
63061	gaactgtgac	ataaggcaga	gagtgctcct	ccagaaagaa	acaaaatact	gtggggctaa
63121	aagaaagatc	accacagctg	agggaaggct	tccaggaggc	ggttccatac	cctctacgga
63181	accagcaggg	cttcgccaca	gccagccaag	actgggatgg	cctttagaca	gcatcaagcc
63241	ccagccctgt	aatacagatg	gaaacaaatg	tccagagagg	ggaagtgcag	tacccaaggc
63301	cacacagtg	gctggggcta	gaacccagg	ttcctattcc	cttgctctct	ctccttccat
63361	gtcaaaagg	gtgtgaaac	taggggatgg	cagcacagtg	cagtggaaag	accaggcaca
63421	tccccaaata	aactatata	tcctatgtgt	acatatatgc	gagaaagggtc	tggaacaga
63481	tgacccaaaa	tggtaacagt	ggttccctct	agggagggcc	tggtatcatg	gcagtgggag
63541	gtagtccagg	gaaactttca	ctttgtagca	tgtaggacatt	tcataactgt	gtattcacag
63601	catgtgatta	agagaccagt	cgcagggggt	agttttcacc	cagccctgtg	tgacctttag
63661	tcagtacgga	ctgcagaggg	caggccttgg	cagacctccc	tggtgaattgt	tctggactcc
63721	ccatcaagag	gctcccggat	gggcatgggc	tttaccgaaa	ttcatcctta	tctacagggc
63781	cacgccttgt	catgaaacgt	cctaccttcc	ctgtagctga	cagggaagag	ccctcacatt
63841	ccaggtattt	gtctcaccta	ccactgtgag	caagggaag	gggccaagaa	gccaggatgt
63901	ctggctgcga	gtcaccaggt	atgactgtgc	actcataagg	aaagacagaa	gtgttctccc
63961	taccacacct	ccaaggtaag	gggggtgtcac	agacgtagtc	tgactgctca	aataaggccc
64021	ctgggtgtccc	atgctgacgg	gaggaactSt	gaaaggcaat	ccaggttgaa	aatgtccatt
64081	tttaagctag	gcaaaagacc	atgccaggtt	cccatgaagg	ggaaaacatg	gtgacataaa
64141	taaaaatctcc	caagagtctg	gcagtcaagt	ggcctttcct	ctttaagctg	ctccaaggctc
64201	ctgatggggc	ttggctgggtc	tcattcatatc	atatgactgg	gcagatacta	ctacttcagg
64261	ggacctgttg	tttcccccca	agaaagaatc	tggtctcact	tatgccact	ctctgatctc
64321	tgtaacttct	tcttcgtagt	actttttttt	tttttttttg	agacaggggc	tcattctgtt
64381	gccaagctg	gagtgtagt	acacaatctc	agctcactgc	aacctccgcc	tcccgggttc
64441	aagcgattct	cgtgcctcag	tctaccgagt	agctgggact	acagacatgc	gccaccactc
64501	ccagtttaata	tttgtatttt	tattagagac	gggttttcac	catgttggcc	aggctgggtc
64561	caagctcctg	atctcaagt	atccgcccac	cttgccctcc	caaaatgctg	tgtttacagg
64621	catgagccac	catgcctggc	catacatttt	tcttttagag	aaacaggggt	tcactctggt
64681	gtccagctct	gagtgcagtg	gcacaatcac	agctcactga	agcttccaac	tcttgggctc
64741	aagcaatcct	cccacattag	cctgagttag	taggtctaca	ggtgcacact	gccacacca
64801	gtgaattttt	taatttttgt	agagacaagg	tggtgctatg	tcactgaggt	tggtctcaaa
64861	ctcctggcct	caagcaatcc	tcccacctcg	gcattcccaa	gtgccaggat	cataggcaca
64921	agccacccaa	cccggccttc	tctgcaacac	ttaacacact	tttactttat	ttgcttctgt
64981	aattagttgt	ctggcacctc	tttcccagcg	agggcagggt	tgagctgttc	ctgtggactc
65041	tatgccaag	cacaatgcct	gagacaggct	ctgaagacaa	atgccgggat	gaatggataa
65101	atgaagctct	gtctcatgtt	gtagcccttc	cccaacaaat	caccatcact	atgctgaaca
65161	cttggcagca	tcccacccca	ccaagtgcga	tacagcaggc	ctgcttggtat	cttttttttt

65221	ttttttttta	gcaagagttt	cactcttggt	ccccaggctg	gagtgcgatg	gtgcaatctt
65281	gactcactgc	aacctccgcc	tcccagggtt	aagcaattct	cctgcctcag	ctacctgagt
65341	agctggaatt	acagggtgct	gctgccacac	ctggctaagt	tttgtatttt	tagtagagat
65401	gggatttcat	catgttggcc	acgctgatct	tgaactcctg	acctcaggta	atccaccctg
65461	ctcggcctcc	ccagttgcta	ggattgtgag	ccatcgtgcc	cggccacctg	cttagatctt
65521	ttatatgggt	tgcttccctg	tacagttccc	cattccctac	aattttaatg	gaacaaaaag
65581	ttctgaataa	aaacaagaaa	atgtgaaaag	ctgtagttaa	tgtaaacttt	tcaattttca
65641	gatgggaaac	tgcaagtgcag	ggaaggaaag	tgctgtgtgt	tttggtcacc	tagctctttc
65701	gcactagacc	cccgggtctc	ctgactcctg	cccctggctt	gtttgctcca	cagaactctc
65761	cgctaattgt	gaggggaaact	gactctgcag	ggaccagcag	tcacacttgc	ctcctccatt
65821	tcaatcttgg	acttggccag	gaggagcttg	cggtaaaagt	cacgtgctt	ctgctcccg
65881	tcggcctcca	ggtcagtcac	ctgcttctgc	aaatcagcca	gcttctgacg	cagctcagtg
65941	atctgggttc	agaggcagag	aggagtgtgt	gaggcaagga	tgtagagcac	tgcaggatg
66001	tgggcagggc	ctggctgccc	ctgggcccct	caacactgcc	cccacttct	cctctggggc
66061	atactggggc	tcagcgKgKc	cactcYcaa	ggttcaaagc	tgctaaagag	gcagMgagat
66121	gaagaccagg	catgccctgt	gggctgtggc	aggaacccca	cattaccttc	tgctcatact
66181	gctgcttcac	ggaccggaaa	tgctgttccc	actgcttggt	cacttccagc	agctgtgggg
66241	agagactgga	gttagcagga	gatgagcaga	gaaggaacaa	ggagagccat	ctcctgcccc
66301	atgtacacca	gcgtcccaag	gtgtgtctcg	tggtgtgtgaa	tagtggctac	agacactgtc
66361	tccatccctc	agctctcgaa	aactcaatgt	tgctcaaagc	catccacctt	catccactgc
66421	tgcattttcc	cttgccagga	aagcaagatt	aacactaaga	catggaaact	acatMgtttt
66481	ggtgaataat	tatggaacac	acacacctct	ttggagggca	gtctgggatt	atgtattgaa
66541	atttcacatt	ttcatcaact	ttaaccacat	aattccactc	tgaagaattt	aaccaataga
66601	aacacttaac	caagtgtgca	aatatatata	cacaaggcta	atcatctcag	caatacctgt
66661	attacaaaaa	aatccagagg	ccaatctaag	cacagaagat	aggttaaaga	aacgatagta
66721	taaacagaca	atgtgcagct	gttaagaaaa	taagaaaaata	ggccgccagg	cacagtggct
66781	catgcctata	attccagcac	tctgggaggc	caagggtggc	caattgcttg	agttcaggag
66841	tttgagacca	gcctggagaa	tatggcaaaa	ccccatctct	acaaaaaata	caaaatttag
66901	ccgggcatgg	tgccacgcat	ctatagtctc	aactactcag	gaggctgaga	tgggaggatc
66961	acctgaactt	aggagggtga	ggctgcagta	agccgagatc	atggcactgc	actctagcct
67021	gggcaaccaa	agtgaagccc	tatcttaaaa	aaaaaaaaaga	aaagaaaaaa	agaaaaacaga
67081	aaataaaagc	cctaacacac	ttcctcagtt	tgaagatgac	actatccacc	atactcttga
67141	tataacaatt	cctcagggaa	gaaaaacaac	cctacatcat	caactaaata	aaacaaaagg
67201	agtattggcc	ctgcccctta	agatatgtca	taaggatcca	caccaatttc	aaaaacattg
67261	catatgataa	aaaaaattac	aaagaattaa	aggaatatag	catatgttat	agatatgaat
67321	agatactctc	aaaggcagtt	aaattttttt	ttggaggcag	gcctaggctg	gagtgagtg
67381	gtatgatcat	ggctcactgc	agcctcctga	gctcaagtga	tcctcccacc	tcagctcccc
67441	caagtagccg	agactacagg	tgtgtactac	cacacccagc	taattttatt	tttgtagaga
67501	cagggtcttg	ctatgttgcc	caggctggtc	tcaaactcct	ggttgcaagt	aatcttctct
67561	catcagcctc	ccaaagtgtc	gggattacag	gtgtgagcca	ccacgcctga	cccagttaat
67621	tttttaaaaa	agaaaagaaa	aaataatctg	taaagcagtg	tggttatata	catatatata
67681	cacacacgta	tatgtataat	tttattctac	tttgaaaaaa	actgagggat	attcaacaaa
67741	ctgtaatcag	ttgtgggttt	ctctaggagg	tggtattctt	gatctttttg	taatgagcat
67801	tatatcactt	ttgaaatcag	aaaaaaaagc	gcttataaca	atacaaaaag	aaatctaaaa
67861	ctaataatga	catcaagaag	ctttcaaatg	tgccgggagg	caagggggag	caggctcagg
67921	gttctagaga	agcacctggg	ctgtgtggag	aggggctaga	cggaaacagc	agaacaagtg
67981	tctacaaaaa	aggagctgca	cttcgacctc	gggtctggaa	agactggact	agactggggg
68041	tgtgaggagg	gggagggaac	catgtgagat	ccatgggaag	aggcggaatg	gactgcagca
68101	cagggactct	gctgcgtggc	ttctctcttg	gcagcagagg	gaaactaaga	gcctcttacg
68161	aactggctcc	tgacacctag	tgggactggg	ggacatttaa	actacctaaa	gacctggcca
68221	tcgccttaat	ggagttagg	aatccactca	gtattctgtg	gcaggcttcg	gctgtggct
68281	ggtccttttc	attcttgctc	aagaaaattc	ttgaaatggg	agtctcaaaa	tatctgcaaa
68341	gtagctacac	caatagaggt	aggtagctat	tttttttttt	gagatggggg	cttgctctgt
68401	tgcccaggct	ggcacgcggt	cggactgctc	cggactcagc	caacctcagc	ctcccgggtt
68461	caagtaattc	tccctgcctc	agtctgagtg	gggtgggatta	caggcatgtg	ccaccatgcc
68521	cgctaatttt	ttgtattttt	agtaggcaca	gggtttcgcc	atgttggcc	gggttggtcc
68581	gaacctctga	cctcaggtga	tccaccgcgc	tcagcctccc	aaagtgtctg	gattacaggg
68641	atgagccacc	gcacccagcc	aaggtagctt	ttaacgttaa	aaattttgac	agtaaattta
68701	tggagcctcc	aggctagtgg	gaagcggcct	taatcccttc	cttccatgat	gggtcctccc
68761	taaagcatct	ctcaagggtc	cctccactcc	tcactcgtga	tgctaaaact	tgcttaactt
68821	atcacaaact	ctttccacca	tccaaggtct	accataggag	cctgcctaaa	ctgtagcccc

68881	aacaatttta	ggccatgccc	cacatgccac	ctcctcagag	tgaccactgt	aggcaaaggg
68941	actgatcaag	agaggacagt	ccagggcaag	gagtcagacc	tcattccatgg	gcaggcaggt
69001	cagtggctac	catgccaaact	cctcatggtg	acntgggacc	tgccagagcc	aggaggccag
69061	ggcaagcctt	tgtgctgctg	gtcccgggag	gtaagaggga	tcctcccact	actgccacct
69121	cggccaccta	cctcactgcg	ctgctgctcc	agcatcttca	ccttcttctc	ggctgcRccc
69181	aaggccacca	cctctgggac	cttacctgcY	gtcacactag	cctggggaga	agcacagagg
69241	agccttcacc	aaaacctcaa	tacaaattat	ctcacccagt	ctcgggtgctc	ctctaagacc
69301	cctcacccaa	gKggcccccag	ccctctgtct	ccctattcct	cccaccagc	aggacaccac
69361	taaacatgaa	agtcagtact	acgtcccctt	ctagaagtct	acaagatgat	gattccccct
69421	ccctgactca	gggtggctgc	caggccctct	ccccttccct	tctcccctcc	ctacggctcat
69481	tctccctggt	taggtacaac	ctctaaggta	ctaccagcca	ctctcctcac	tccttacaca
69541	catcagccaa	aaaactctct	ggcctggaag	gtaagacatt	tgagatgtag	atacagacag
69601	atatagatat	agatatactc	attctataaa	acatatatgt	tttataaaac	ttttacaaaa
69661	gttgaaagtta	tataaaatgt	ttatttataaa	acatttttag	aaagatgcag	aaataaagat
69721	ctgtgttaata	cacatagatg	tttcccagct	ctgtcctctg	taaggggcta	aagcagagac
69781	atccagcagc	actgagcaaa	cctagtgtctc	agttgggttc	taaataccat	tttcttttta
69841	ttaaaaagaa	acagggctgc	tttgaggggc	tgagcagat	aaaataaag	gtgagtttga
69901	tgcattcttat	agtgatggaa	agtaagggaag	tgctcaaag	aataatacta	ataacaataa
69961	taataaaaaga	gcatgtcaaa	agggcacaaag	agacaacctg	aaaaaaacat	ctatggccaa
70021	aacgggaaca	ctttgaacag	caaaatacat	cacaatagta	ttggattata	agtcacagta
70081	tgaaataaat	actcttgagt	tcatactgat	agaacaaaaat	agctgaatca	ataaataaat
70141	gggggagaag	ggacagctct	tccttacaaa	agaattctga	ttaataagtg	taggaagaat
70201	gaggaataa	tgaaatcacc	attccattac	tacagtaata	actRctgcag	gtggagatcc
70261	accaaaggctc	actaaatca	gtgagtgaag	gtttaagaaa	aaatagagta	ttgtcatagt
70321	ctctaatgtt	ctcctcaaaa	ataaacactt	attaattaca	aagggaaaaat	tggtcactgt
70381	attgcagaaa	cttgaaagac	agcacttggtc	caagtgtatga	agggttaacag	tagtaaaaca
70441	ctgacatcat	gtacccctgg	tctgtctggac	tgagaaatat	tctgcacact	ctgatgtaca
70501	cagaacgtca	cctccgtgag	attcttgcca	aaacacgtaa	cctcaatctc	ctcatgagat
70561	ccaatcactt	gtgaggcctc	aatcgtgaca	gcaaaataagt	ctatactgaa	aaacattcta
70621	caaataactg	gccagtacaa	ctcaaaagtt	tcaagggtcat	gaaaagcaag	gaacagctag
70681	gaactgtcac	agactagagg	aaaaagaggg	agaagagaca	actgaatgca	atgtgggatc
70741	ccagactcca	tgctggcaca	cgacaggaca	tgagtgcaca	tctgggtgaaa	tctgaataaa
70801	gtctgtagtt	tactaagtag	tacatgccat	taattcctag	ttttgatcat	ttaacctggg
70861	ttctataaga	tggtgcccgt	aSgggaagta	aagggaagggg	ataggggaac	tctctagact
70921	atttttgcaa	ctcttctgta	agtctagtta	taccaaaata	aaaaggttta	aaggttaaaa
70981	aaaaaaaatag	caagtgtctgg	gggtgaaacag	cagacaaggc	cagtagtccg	gaggggtgtg
71041	gtcgaactcta	tctccaagcc	cctctgtgat	ggacaccaag	accctcgtct	tctctgggct
71101	tcaatgcat	gagaagctca	aacagaagaa	ggctctgcagg	ccccatccgg	acttctgaca
71161	ttgtctgcca	tcactctgga	gtcagattctc	ctctattctc	agcgttctct	ttccagcgtt
71221	ctctttccct	ccacactgca	cccccaagtg	gcttcaggta	gggctgggtg	cagagcttgc
71281	cccctacagg	ctcaggcctg	taagcacacc	atagcaccaa	ggagcaaggt	gagggggagc
71341	cctccaagga	aggtcacccc	ctttgagaaa	ggggacagac	aggcctgccc	acttgaaatc
71401	tgccgcatct	tggatgggag	ctgtgcttag	caaaaagggtc	aacaagttac	cggggaagga
71461	ggaagagggt	ggattccagg	ctctagggtg	gtgcaccctg	aacctccgag	agggagagag
71521	gagtcacagt	ggagtcagca	gagctggctg	ctggcccaaa	atctccccta	aagagcaaca
71581	gctaactgtc	actgtttacg	acgttaaacc	tactttacaa	gcattgcatt	actgaatcct
71641	cacaaccacc	ccttgaggca	ggtgttacta	tcttcatttt	acagaggaaa	ctgaggccta
71701	ggagtcttat	gtgacttacc	caaggttgca	gtgctggtaa	aaggtggagc	tagtattcca
71761	cctgcatgca	attccaaggc	acactcgtcg	cccctctgta	acacatgcct	ctaagagac
71821	agggtgacct	ggggcacaaag	ggcaagtgcg	tccactctc	aggaagggca	ggaagagcat
71881	ctggctcggg	gcattcaagg	aagaYgagtg	gagattaaag	ggcacaggaa	aagtaaaag
71941	acctgtccag	ggaattccac	acctgaggca	gctcagagaa	cccaagggag	aacagccgag
72001	tctacaagtc	ccttccacaa	gagggcagac	aaggccggat	ctgatttggg	gaataaaggg
72061	aagaaaagag	gatctccatg	ggctgggatt	cggaacacca	gggaagagca	gactttcacc
72121	atttatcagc	atgtttccct	ggccgtaccc	tacatctgcc	tgatagcagg	tcacacagaa
72181	atcctgatta	tatgatgtta	cttgacctct	ccaaacctat	ggccatagct	atagaatgga
72241	atactagtcc	cagccttgcc	tactctatag	gtagagatga	ggcccaataa	agaWaataga
72301	tttgcatgtc	ctgggtaaac	tctcattgtg	cacacagtaa	taaggaatta	agccattacg
72361	gtaattgcta	ctattgcata	ggtgtagggt	gggttaaaga	cattgagccc	tactgttcag
72421	ctattaaacc	ccattaaagg	gtgaagtaaa	aacacgttgg	taaagagttg	ggactcagct
72481	ctgcagcaag	gggaatggta	acgactgggc	aaggggtgca	gagctctgctc	ctgcttggga

72541	cctggatgtg	gccagtgctg	ggactagagg	ataggggagt	Rggccagccc	tgcagcatca
72601	ccagaccaca	cagacactag	ccaacaccct	ccctctcca	ctttagaggc	tccagagaca
72661	caatcccagg	agcttagcag	aatccaaggg	agcttgctca	accaacctaa	ttctgccagg
72721	aatatcaaag	atgttaaact	gacttttggg	aaccactctc	taagacagac	cttgacaaac
72781	tggaatgtNT	ttacggaatg	cacccagact	gagcaaacga	ctcaacacca	ccttctatga
72841	gcaatggctg	aaggaactgg	agctatttag	ccaggagaag	agaaggctta	tgaggcccat
72901	gaagccacag	tgactaccag	cagcctctaa	gcattggagg	caggccaagY	aaagaaaaaa
72961	acacgtaaca	gctagaacct	tctaccactg	gcactggctg	caggagggag	gaggctcact
73021	gtcactggag	gtggtaaagca	gaggctgagt	acctgcaacc	aaggatgcta	cagaaggaat
73081	ttctgaccac	atacctgctg	ctgtcYagcc	actgccttct	tgctgtccc	ttccatcttc
73141	ggtgagcctg	gccgcccaga	cRaccctct	ttgttgccat	tgctcatcaa	caacttcttg
73201	agctccaaat	tttctccct	gggatggagg	taaacagaga	aatcacaatg	ctgaccttga
73261	gttaagaaaac	ctMcagggct	ccttaatgct	cactatcgca	tgagtgcag	ctgagcccca
73321	gggagtactg	caggatccctg	aaacctgccc	tcctggaaaa	ccaaaaaggg	catcttcagc
73381	taccttgctc	tcaatctgtg	gaggtctctg	attgtcaatg	gcagggtttc	cccagctgtg
73441	gaatttctat	gcacacaaga	ccttccggat	atatccaaac	actgcattaa	ataaccttgg
73501	atcacattct	agtgaagaa	tgacaccctt	tccaattatc	ttcacatttc	ttgtgtagac
73561	cacggagacg	gtgcgagctt	ggtgctaaca	ggccctgggc	acctctctag	ttactcgcca
73621	gtttccctcg	ttaacacaga	aggtgcaggc	tgaggccca	gagccttcaa	tgtgcaatga
73681	tccttagcct	gaatttatta	acatcctttc	actttcattg	tatttagagt	tatcttctat
73741	ttatcacagg	taattgctgtt	ttccatttac	tctagttaaa	gttgccctta	taattttaag
73801	taaaaagatg	aatcaaatta	aagtaaaatt	ctaagtaact	aataaggcag	gtgatagagg
73861	agatcataaa	attagtgtatg	tggattcagg	tctgactaaa	atgtttcttc	tttctttttt
73921	ttgagatag	gtctcgttct	gtcaccagg	ctggagtaca	gtggcccaat	ctcggctcac
73981	cacagcctcg	actgctccta	ctcaagtaat	cctcccacct	cagccacccc	caacctcccc
74041	caccacacac	ccccaccctc	ttgagttagt	gggactacag	gcacaccacc	acaccagct
74101	aatttttttg	gtattttttg	ttggggctgg	Rggaggggtg	gtgatgtatt	tcaccaggct
74161	gtctctcaa	actgggactc	aaagcaatcc	tcccgctta	acgtcccaaa	gtgctgggag
74221	tacaggtgtg	agccacaacg	cccaaccacc	acttctttat	gttctatttg	ccagctgagt
74281	ttccgcttga	aaaaccaata	agtaaaatga	ctttcccaag	gtcatacagc	agagacttgc
74341	attcttgctt	tctaatacgt	gacttttttc	cccagcttca	gtttctgaat	ccatggatgg
74401	ggtcaYtagg	gctataaaaa	ccccaaaagt	gcatccttgg	ccatccaaaa	gcaaataaat
74461	tacacactga	ttcaaaaatag	ccagtggctc	agtagttaaa	cattacttct	gtggccatac
74521	ttacaaagt	tatatctctt	ctctttctgt	tgattctaat	aagaacacag	agaggaggga
74581	aaaacagagt	ggcaagtcct	gtctgtgaca	cgggcctttc	ctatgtgcct	gagccagct
74641	ggtaccacc	agatgactca	tcacYcaaac	tgtccaggac	cacagtgcag	gcaggaaatg
74701	tgccactca	caggatggag	agcaaggagg	cccaagtctY	tggtgtaaga	ctccaatcaa
74761	gtccctgcct	ctccctgggc	ctcagttcc	cctctgcaca	gtgagaggtc	tgtctgcatg
74821	atctccaagg	gcttgctcaag	ctctgacagt	caagatcagt	gtttcccaag	gcgtgatcct
74881	gtgcctacct	cgttcataat	cacagagact	cctggtgaaa	tgcaaggctcc	taggtcttgc
74941	ctaagacctg	tcaattcaga	atcttgcaaa	ggaagggaag	gaaggcgat	aaacttgtaa
75001	tgcccttccc	tgaccctcaa	ccctcagtta	agtctaagcc	ccctagtcca	gtgggggagc
75061	tctcatgttc	tcaggaagac	agagcaggtt	gggatggtga	ccagcaggag	gcagcaaagt
75121	cctgagtcct	ctggacagcc	agttcaccgt	taacagggga	gagaggcaag	tgctggagga
75181	ggaagggaag	acaatctatg	ctgaccttct	tctgaagctc	tcaaggcact	ctatacacct
75241	cccaagggtg	caaaagggcc	agagagaaaa	tacaaaaaga	gccaaggaga	aggatcaaga
75301	gacgtaacct	ccaaataggg	ctctgggcac	agggcctcag	agccacggtc	ctcaaccag
75361	aaatcagtcg	tgacacaccg	cYctctctcc	tgacccccM	actcctcacc	ccttctctga
75421	ggggcctgaa	cttaccgcag	cctctcggca	gcctgatccY	gctgttcag	gcccttatec
75481	aacttggcct	tcagagcctc	gttctccttc	cgaagctgct	cacacagggt	ctgtggggca
75541	ggggaaacaga	cagggtgagg	gaaaggagg	gcccctccca	ggtgcaggct	gagctagagg
75601	atggtggggg	gcctgtagcc	acccagggc	ccaactcctt	atccctttg	cctggcctca
75661	ccccatccct	ctctaaggag	ctaagccact	tgccacccca	cgtgtcctct	cccttgggag
75721	ccaactacg	agaagcctga	ccaagtatca	gccatggggc	cttctgtctc	tccaagacag
75781	acagctccat	cccttctcct	tcatcctctg	tcccactgcc	gggaccccta	ttccccacca
75841	gcctccccca	gctgacttct	acYcttcttt	gaagtcttag	tttaaatccc	atctcctcag
75901	agaagtcctc	cctgactccc	cgtaccagct	acattaggct	aactccgcta	tccttgctca
75961	cagccccccg	cttttacgct	tctcagacc	tgtggcagat	aaagctaagg	aactgttctg
76021	gctgctgttt	tcttaatatc	taccccttta	cccctaatta	attcctgagc	tcccgagggg
76081	ctggggacccc	taacctYct	cttggtcact	gccagatccc	cagccccag	ctcaaggtt
76141	gtggaaggaa	caacatgact	gaacagccaa	atgagcaaat	ggacaaatga	gcaggcgagt

76201	cctagggggg	ctgaaaggca	caccaatttg	cagggtgtgag	aggtgcccag	tgttgccaag
76261	gggaaaacca	gaagacaagg	cattcagtcg	ggacctcact	atgccctcac	gccctcacaa
76321	tgtggctgtg	acacttggtt	cctcctctac	aaaagaaaga	caactgtttc	tctttttttt
76381	tttttttttt	ttttttttta	gacagagtct	cactctgttg	cccaggctgg	actgcagtag
76441	catgatctca	gctcactgca	acctccacct	cccaggttca	agagattctc	ctgcctcagc
76501	ctctctgagta	gctggaacta	cagggtgttg	ccacctatgc	tggctaattt	ttgtattttc
76561	agtacagacg	gggtttcacc	atgttggtcca	ggctggtatc	aaactcctga	cctcaagtga
76621	tcacacctgc	tcagtctccc	aaagtgtgtg	gattacaggc	atgagccacc	acacctagcc
76681	cagggacaac	tgtttcttct	ctgcctcctc	tatagggtcg	ctgagaggga	cagatgagac
76741	agtggagatg	gaagtgtcca	tgaacctatc	gtcacttgct	tatgtgcggg	gactcatatt
76801	ggaagctctg	tgaactgggg	gcatggaaga	ggggtcgcca	gactcaggac	ctcacaggct
76861	gggggggaagg	gaaggtgtctg	actagcaatg	ctagcatata	gtgtcagcac	agagttgttc
76921	aatcttttcca	cagatcctca	ctgagcacct	cactgtgtgc	aggtacattg	ctcggttttt
76981	ctccatatac	tgccctcactg	gtgcctcaca	acttctctca	agctaagtaa	ctcatctcta
77041	tgttaaaggt	agggaaacca	ggtaaaatga	tacagtctaa	caggtgcaca	gctgctaaga
77101	ctcatcactg	gcggggagta	aaactccaat	tggcagaccc	cacactgggtg	tctctttccc
77161	ctgtgatgaa	agatcagaga	agggagagag	atggtgcca	aaggagggga	cagcctttga
77221	gctggggcag	gaccagggcc	attcactaaa	cagccatctg	ctgccttcca	cctcccaggc
77281	ctgttgacag	tggatgcaac	catgtgacta	gttctggcca	acaaaagagg	tgtagaaggg
77341	acaagcatca	ctcctggact	ggcctacgca	caattctcca	gtctcttttt	cctggtagca
77401	ggggctgatg	tggatgcctc	gtattctaaa	gggcaccgga	aagtgtggcc	cctgtctccc
77461	tgggactcta	aggaactgtg	tagagcagaa	acaaaccct	gccacacaga	ataggaggga
77521	aaacttttgt	tgtgtaaccc	agggagattt	cagagtttgt	tcattttctga	ctcacaaagg
77581	agactcttgg	gaaggctgaa	tggaggacac	agccttcaac	tggagggtgg	tggacaatga
77641	gggagatgag	gcttagcaaa	cagagaacca	gctgggcatg	gtggctcaca	ccagtaatcc
77701	cagcactttg	ggaggctgag	gcaggaggat	cacttgagcc	caggagttca	acaccagtct
77761	gggcaacatg	gcaaaaccct	gtctctacta	aaaataccaa	aaaattggcc	aggcataagg
77821	gcgcattgat	gtagtctcag	ctattcaggg	aactgaggtg	ggagaactga	gcccaggagg
77881	tcaaggctgt	agtgtgctgt	ggtgcgacca	ctgcactcca	gcctgggtgg	cggagcaaga
77941	ccctgtcccc	caacaccct	taaaaaaaag	aaatcaaaaa	attattgtta	tgagtccatt
78001	caatgcctag	cagagagcct	tatgctatac	ctgaccttga	atatgtttgt	ttagtgaacc
78061	aagaaacaca	tcagtgaatg	aatgaggagg	aactggatca	atacaccctc	accaggcag
78121	taaaaatacc	caagatgcca	tgtctctggg	cgaggcctcc	agggacacaga	atggcctgct
78181	cctagtccct	aagggaaggc	caggacaagg	cctcacttgc	tgctctaccc	ttgcagtcta
78241	gagagctggt	tccttggagt	ctctgggcca	atgccttggg	tgcaaacccg	ccaatggata
78301	gaatcatcag	aggtcacaaa	gatcatcacc	ttccatccaa	ggtgctacga	gagctatgag
78361	ttcatttgat	catttattat	tttgtccttt	cattcattca	ccaagtgtgt	atgaagtgcc
78421	acgaactggg	aYgcaacagt	gaatacaaca	gacatggtgc	ctgccccct	caagcttacc
78481	ttctagcaga	gagtataaga	aaaaaaagag	tataagaaaa	aatgtattaa	ataaaattat
78541	tacaaactat	gataagagct	aagaaggaaa	taaaacaagga	ggggactgaa	ataaaaaata
78601	acaKaggttg	gcaggacccc	ttttaagggg	cctaggatct	atccccatct	caaagctgaa
78661	aagtggatgc	gcaaagtgtc	ctcaccctag	gcaccttctc	accctgcccc	cagcctaggg
78721	actgtgccag	gctcaccttg	ccagggttca	gcctggatac	cttgaaagcc	cactgacatc
78781	ttaaaggggg	tcccttctct	cagcctggct	ctccaggcct	ctgcctctcg	ttcagcctca
78841	cttcccaaca	caccctctcc	ctccagggtg	gatgggcatc	ctccgtgtct	ctctaccccc
78901	acacctctcc	tcatactgca	tctccaacct	gattgcccct	catgcccctg	gcaaccaagg
78961	tcacgcaagg	gggactcccc	cttctgccat	cagcggggca	cttgagtggc	tgctgacatg
79021	aatgagacca	cagatcagag	aatggccttg	gaggagagtc	tgacgggagt	aaggaggctt
79081	caagtcatgg	ctctgtcact	aagggtggcg	gcactcagat	cacgagcagt	ccctcagaag
79141	cctccgtttt	gccatcttta	gaatggtcac	caattataac	tgaacactts	cccgtgcta
79201	aagccacaaa	ggctaagacc	ccctgccccg	tgtggatgcc	cgctcatgaac	tccgaatggg
79261	gacctctctt	ccagcatgga	ctaggttctg	gactgcactg	ggtgttctat	gtacatggcc
79321	tcattttaatg	cagcaatcta	accatggagg	cacttctagc	tcattgttact	gataggaaca
79381	ttggggggata	gagaggataa	gtgacttctc	caaggctata	cagcaataaa	gggtcactac
79441	tggaaaccaag	gaccatataa	ctccaaggtc	tggcctggcc	tagcaaggaa	atctgtccat
79501	tccccacagc	acagggaggc	tttcaaaaag	aattcaatag	gggaggcagg	ttgggatggt
79561	ggtcaagagt	atgggctttg	gaatgcgaga	gatcgagggt	ccaatcccta	cttcaccatt
79621	taccagctgg	gtgaccttgg	gcaaaaaaag	ggctgtcttc	ccacctgtga	agtggtgata
79681	atgagggtgc	ctaccctggg	gggaaagagg	cattatgaaa	ggagtgtgac	tttgttccct
79741	cccttcccat	cccccaacct	tgacatgag	aaataaaggc	agggctgctg	ggggtatccc
79801	caaccatgac	actcgcatg	cccatccctg	atttcccat	tctcttctc	ttctcatcc

79861	ctccccacaN	cttcccttate	ctgttcatca	ccctgaacaa	aaagcccga	gtctgcccac
79921	aacacagSct	tcagaagtcc	ccatggtacc	agtggattcc	caggagcagg	aagggtggaa
79981	gagctcgggg	ggaagcacgc	ctgcctgtct	cgggctgccc	tccccacgcg	cctcacctgc
80041	agaatggagg	tgcgtgtctc	attcttgtgc	accttggatg	ccagtcgggt	gaactccagg
80101	gccatgcggc	ccaggtgggt	gaagagctgg	ccgtggctcg	gtcctcggc	acacacactc
80161	agcgtgggtc	ccaggcgctg	caggtgcagc	atcaggttgc	cgctctcacg	ggScaggggg
80221	cccagcRcct	ggagagggaa	agggcacacg	gcccactctt	caccaaggcc	tgagtaggag
80281	ccgccagtc	attctccctc	tgcttccctc	tttctcatga	ctcagtttcc	ccctgtgacc
80341	ccagctcagc	cccgggaaat	tctccagtta	tgcaaggttcc	ctgtctgggg	ctgactcaca
80401	gggcagaacc	caggactcac	aggccactgg	tggctccaca	gcagcggggc	caccatcctc
80461	ccacacactg	ggccttgag	agtgcctgac	agtaagtac	ttgtctgctg	gacctcagca
80521	tcctcatcta	ccaaatgtcc	gcacaaccct	tccctccctt	caacctcaca	gggttcttag
80581	gaggatgaat	tgaccctga	cagtaacaag	cccagaaaag	ggacatcact	gcacagctag
80641	ccctccatat	ccatgggttc	cgcatccatg	gattcaacca	actgcagatc	aaaaatcttc
80701	taaaaaaaca	aactggccgg	gcgcgatggc	tcacgcctgt	aatcccacca	ctttgggagg
80761	ctgagcgggc	agatcacaag	gtcaggagat	caagacggcc	tgagtgggtga	aacctgtctc
80821	ctactaaaaa	tacaaaaaatt	agctgggcat	ggtggcacgt	gcctgtaatc	ccagctactt
80881	gggaggctga	ggcaggagaa	ctatttgaac	cagggagtcg	gaggttgcag	tgagcagaga
80941	tcgcaccaca	gcactccagc	ctgggcaaca	gagcaagatt	ccgtcccaaa	acaaacaac
81001	aaaaaactgt	attgaacatg	tacagaattt	tttcttctgc	attattccct	aaacaatata
81061	gtataccaaa	atttagcatt	tacattgtat	taggtatcgt	aagtaatcta	gagatgattt
81121	aaagtatata	ggaggatgtg	tataggttat	agggaaactac	tacgccattt	tacatcaggg
81181	acttgagcat	ccatggattt	tgggtatcct	cagggagttc	tggaaacct	ctcccatgtt
81241	taccaaggga	catctgcata	tacgtcctgc	aacctccgcc	tcctgggttc	aagcgattct
81301	cctgcctcag	gctcctgagg	agctgggatt	acaggtgtgc	accactacac	caagctaatt
81361	tttgtatttt	tagttgagac	ggggtttcac	cacaatggcc	aggctggtct	tgaactcctg
81421	acctcaggtg	atccacccac	ctcggcctcc	caaagtactg	agattacagg	cgtaagccac
81481	catgcctggc	ctacacatgt	gtcttctggg	gaatggccca	agcattcatc	agcttctgag
81541	gacccaagac	tcaaaacagt	ttaaggaacc	acagctttag	ctatttcaga	aagtcccaaa
81601	ctagtacagt	atgtaagaaa	taaagcacac	cgtgggccag	atagttgact	ctttctctct
81661	agtctatctg	gaatactcct	accaaagaca	ttgcctttgt	tacaccaatt	ccactcccaa
81721	ggacctgcag	tgttacccta	ctgcagacgg	cactgggccc	agctcccctg	ctgggcatct
81781	aaggccctac	agccgcagg	cccatccaca	gcagcatcca	gttgggctcc	ccactttacc
81841	ctgcctgaac	ccacacacac	caggtctggt	gtctctgcac	gtgtcctctc	tgtgtcctct
81901	ctgcctctgc	aagttctgct	catccttccc	accctgtcca	cggctcagct	cctccagcag
81961	cctcccgga	acagttatgg	gaatcacagg	acaKcagagc	tacagggagc	ctcagagatc
82021	aggccgggaa	accaagctat	ggggaggagg	aacttgccca	aagttgccct	gtaagtcagt
82081	ggcagaggta	taacgagaac	tgaggtttcc	tgactcgcca	tccagtgtct	tgctgcactg
82141	acctcccact	tctctgaact	ctggaggaa	ggcaatgact	ataaccMcaa	cttggcattc
82201	cctgaacacc	tgtgtaaatg	cgtcagtgtg	ccgcattcta	acaagaggaa	atgctgctgt
82261	ttcaactctg	catccattcc	cccactgcct	ctttccacaa	aggagctgag	gtggcagatg
82321	ctgctctatt	taaggctcat	gcgatgcttc	ccatgcctgc	gacttctcca	gactacaagc
82381	ttcagagcac	agggaggctg	tgttgtcttg	gctcaagtgg	ctcagcagag	acaggcacac
82441	tgtagagcta	atgaggaa	tactacgtca	gttaaagtta	tcggtcacaa	gtcagagtga
82501	aacactttct	gagcagggga	tcttgccctc	atggccagca	tctcagagcc	ctcagggaca
82561	gaacaggaca	aggggacaga	aggttccagg	cgacagaaca	taaagagcct	ttccaatact
82621	cagagctgcc	tgaggcagtg	gtgagcctct	caacactgaa	ggcatgctag	ttagccagac
82681	agccacctga	gggggccYtg	cactgggcac	tgacaggtag	atggggcaac	cagtgaacac
82741	aagcatat	gtcagccaaa	cctttgtgaa	gggaggcagc	agggatcaat	atatcagtga
82801	agggctagag	cacctattgc	tcgcataaca	acaattaaag	Raaaaaactt	aaaagtggga
82861	aggaaggagg	aatggagaag	gtagaaattt	aagtcgttta	agaatcttc	cagacttttc
82921	acaatggttc	ttcaataagt	ctgccatttt	aagaaagaac	agaaggagat	atagttagga
82981	aaaaggcagc	cagtgttgta	aggtgtggaa	tgaggatgct	gggcagacgc	tccagagctg
83041	tacgagagag	agagagagag	agagagagag	agagagagag	agagagagag	agagagagag
83101	tgtgtgtgtg	tgtgtgtgtg	tgtgtgtgtg	tgtgtgtgtg	cgcgcgcgcg	cgcatgctg
83161	taagtggaaa	gttgaaacct	cttcctgtgt	gctccaagag	tctgcacaaa	gagYaaatca
83221	cctgtcttac	agggccctgg	gccttcttRa	cccttcttcc	tccccggggg	ttggagccc
83281	acagacccaa	agggctgagt	catagtgtgc	ggaggtgcct	ggccccctggc	agaaggcaac
83341	agggctggga	aagagccag	gctttcacaa	cggtcgggtg	cccgtgtgct	ccaagtccgg
83401	gaagtacta	gcccaggaa	ttgcatatgt	gagcgagaag	caccctttgc	tcctgcccct
83461	cgtgtatccc	caagtgaact	caggRtacct	aagggatctg	aacaggttct	gtgcctctca

83521	catggtagca	agtgcacagga	cacaaagagg	gcagcaggtc	aagccccggg	tectgcccgt
83581	ccactcacca	tcgcattggc	atggctgctg	ctctctgggt	aattctgctc	ctcaggagtg
83641	accacttcaa	attcagagga	ggtgccctgt	gcagaaagga	aglttaggtgc	tgcccagagag
83701	aaaaacagct	cacccctcct	ctgcggccct	gtggctgaga	gcagcaagg	ggacaaaatc
83761	tcttccatt	ttgagtacac	agggaccgtt	acatatcatc	tcacatRaga	tcacaaagca
83821	ggattctcga	caagcctgtc	atagccctct	gcataatgtg	aggctatata	ccctcgatgg
83881	ccaatcctct	tttgtagaag	ggagatRtgg	gactagctga	ccttgaacca	gcagcactgt
83941	aggattgcat	tttttaaggg	cgtgtacttt	ttaaatgctt	tcatgagctc	cattatttct
84001	cagggtgacc	catggagtgg	gtcagaagg	tatatcctct	ttggaaagat	gaggaaacta
84061	cagtatacag	ttggttaatg	caaaagcagg	gattgaacct	aagactgcag	atccagcatt
84121	cctgccacgg	ccccagagct	gtctcttagg	cccagacgtc	tctgatcgg	ttcccagaac
84181	acagatggca	gctgttacgg	ccaccaccaa	gcagtYcctg	tgctggcctt	cccaagccag
84241	tcttgagag	cccagaggag	tgaactgac	tgagaaaagt	cccagagatg	atccacaaa
84301	tttgagagct	atctcaggat	tcaaccaa	ccacgggtgc	caagaaatcc	cagatttttt
84361	cacatctttc	cgctattcct	agtagaatta	ctggtcattc	aaccaaccaa	gaagccaatg
84421	gcccacctga	accagccatt	agctctggga	tctgggattt	ccatgtccc	ttaaacctgg
84481	tctgcagcct	cccttcaccc	cagaaagg	caggatagat	gagaggagtc	agtgctcagc
84541	ttccagctga	ccctcatggc	caccaagaac	tcacctctgg	ctcttgccc	tgccctagaa
84601	agtctccctc	ctccatctac	atcttcccca	ttaccctgt	aacctcagaa	caggtYcttc
84661	tttccctgca	cctgatctgt	aggataagga	tgctgaacta	tgcaatccct	tgtaggatac
84721	caagcaaaac	ttctccagcc	aaatctgtag	atctttttt	ttttttatga	gagggcttga
84781	ctctgtcacc	caggctggag	tgtgggtggc	tcaacatggc	tactgcagc	cttgacctcc
84841	tgggtctca	cgaccttct	gcctcagcca	gcctcccaag	tagctgggaa	cacagacata
84901	caccatcaca	cctgactact	tttttctt	gagagatgga	gtctcactat	cctgccagg
84961	ctgggtctcaa	actcctgggt	tcaagcaatc	ctcctgcctc	agcctcccca	agtgtcggga
85021	ttataggcat	gagccactgc	gcccagcctg	tagaagatag	tttctgagcc	ctctttgaga
85081	atgtgagctc	catgtcacat	ctgtctgttt	tcctagcact	gtgcacactc	agtgtacttt
85141	aacagtatac	aacttagtaa	gtgagaagaa	ttccttgtag	ataccagggt	cttcttgata
85201	agttttaact	atgaccttca	tttcaaaatg	gggaggctga	ggccccagag	agtttgatg
85261	ggacttgccc	aatatcaccc	agcgagacgg	aacacagttt	cttgacctca	acctcttttc
85321	ttcattgttc	tgtagctgtc	agtaggactt	gaggtccatc	caggcaacct	ccacctatga
85381	ctccaaataa	aacttacact	ggatggaggg	ttctggactg	gtgctggcct	gtcactgggg
85441	catgcagRgg	ctgtgggaga	tgctgtgaca	tttgagtcct	ttcctggaga	atcaagaaag
85501	cacagatgaa	ctgactggga	aggggagaag	cccagggtacc	acctctcaa	ggacagccct
85561	tgacaaaagg	gttctcagac	aggattcccc	actcgagtgt	gggagaatgg	gaggtgtct
85621	catcagggcc	aggtagtctg	agaaaaatgg	ctgccctgga	gtgacggggc	agagcctgag
85681	cagagagacc	atgctccctg	ggcttactgg	gaaaatccca	agttggctgc	tgctccttgc
85741	tgccctgaac	aggcctcaat	gataaagaca	atgatttaca	atgtgaaaag	tctttatgta
85801	tctattatcc	cagccattct	cataaaagcc	ccatatcccc	atgttaaagg	tcagagacct
85861	gaggcttggg	aaggctcatc	Mcttgcccac	agccacatag	ccagcaactg	caaactcagg
85921	actgagactt	ggccctccct	ccctgacttc	ctgcagtcct	tgctgcagg	agctccttga
85981	aggtagcttc	atcttctcat	ctgagagtgg	acctggcacc	aatcaggaac	tcaggaacat
86041	tgctgaatag	acaagcagag	gctggaaaatg	ccactgact	gcagcacagt	ggactctgag
86101	accatcactt	tcctccattt	gtccattcag	caaagtcaac	caccagccaa	tagaaggctg
86161	tcacattggc	ctgggcccaga	taccatacag	tagagctgca	gcaggaggca	tctgagtcca
86221	gctgaggtgc	ggatcatttc	catcctgggtc	ccagacctta	ccctggactt	ggagacatgc
86281	cagagtaatg	cacactctgt	acgcatgggtg	atgcctctac	catacatggg	acttcaaccc
86341	cgagccacag	tcacctgtgc	ctttaatggg	cagcacacgt	aaccttacat	ctgaaatacg
86401	ctgcagcagg	ctaacaggca	agcccagctt	cttccctggg	cctcagcttc	cctaattgta
86461	aaatggacgc	gcagggcacg	accagggagc	ttccaaacta	tatgccagct	ccaagtgaca
86521	gggagtagct	gcttggagYg	cgatgcctgg	cacacagtag	ctgctcatta	aatattaaat
86581	atgctgataa	agaccccaag	gccacaggac	tgcaatgtag	tcaactgttg	tatctattac
86641	tcattgtctgc	tggggcctca	ggagtgtcga	gtcactggct	atctttaaaca	agattgtttt
86701	gaagtccctt	ccaaatctga	ccttctgggg	gatgtggcag	ccaaaacatg	aatggaagg
86761	tagcctgtga	cctaaggata	aacgagagaa	tgtggRtttt	ggcataagaa	gggagttcac
86821	tgatgaagga	ttgggcagtt	tggggtacag	ggagagtcag	aggtacccag	actcctctta
86881	tacctgtgag	ctcagccagg	gggtcgaaag	agcccaagga	gggagaaggt	ggtggagaca
86941	gctcgttgct	cttcactagc	tcctctgcct	tctgcccagg	cctggctgct	tccactctgg
87001	actcttccaa	aagctccctt	agagttattg	gggaagagga	agcaaaagca	tttactYggc
87061	tcagtgtgct	gcttctcccc	gtcccaggcc	cctaaccgtg	ctgcgcctg	gcttctgagg
87121	ctccaggccc	tggacttcac	tcccaccgtt	gctctgtggg	ccaagtggga	caaactccat

87181	gctggtccac	cataagaaac	aggctagagc	aaggacgagg	gccagcaat	cgggggacac
87241	aggagcgga	ggaatctatg	agaaactcct	cggtcctccc	aacccccagc	attctctttc
87301	tgccccactc	ccttcacacc	cagccagggc	actccacaga	aagccagggg	ctccccacc
87361	ctacgggcta	cccacagcct	gagccaccag	ggcaaagggc	tgctgcagag	gcggagacct
87421	tggataattc	caaccagccc	tctaggcctc	cattttcctt	ctctacaag	tggagatggg
87481	gaaaccactc	ctccctcccc	agtcggccat	cccaagcaag	gatctgccaa	gcaaggagaa
87541	agcattttta	aaatcagggg	gctatgctcc	cctctaaaac	atgagactag	agaagggcac
87601	ggcaaggcaa	aggaagagtt	tcaggagtgt	ggaagaaaga	gagccccctc	tggatgggga
87661	aatcaatgaa	agccttgtct	ggaggagaag	ggggcacagc	aactgggtgc	tgatgcacag
87721	ggcccgctgg	tcgtgtggag	ggaggtgggg	ttgttctaaa	gtggggatgg	cttgagcaag
87781	agccaggaga	agagaactga	gggacctacc	acctccttgc	ttcaagccaa	gctctgtctc
87841	ctgctccaac	acctaggaac	gcgtgcccc	gttgccctgt	catgctggct	ctccccatct
87901	ctcgtgcccc	agaaagagga	gRccactcta	gttccatggc	cattaactgg	gccttccagc
87961	cccttttccc	ttagcccacg	ctccctcttt	ggacctgagt	cctgtcatcc	tggtttccgg
88021	gtgctgagga	atcagggttg	ggaatactgt	caccatgcta	catggtgcat	agagacagct
88081	gtgaggcaga	agccagcRct	gggccaggag	ggacagggga	tgacttgggc	agaggcatat
88141	gccagcttca	ttctccactg	ctagtagagg	gactggcatc	acagtctgca	gggagggcg
88201	ctcgcaggga	ggggacaggg	tctgctttac	ctaacatctt	tatcccttgc	atthtttctt
88261	tcagccggga	attctccttc	actaggcgct	caaaagctgc	ggatgcctct	cctgagggca
88321	cgctgcccc	agggctcgtag	atccggtagc	gtcctctccc	ttccatgagg	gtagctcagc
88381	ccctgcccgt	gtgcccgcct	ggctgtaaag	acaacagcag	catatcagca	ggctggccag
88441	gccatggggg	catcctttgc	agagaagctc	tagtctgtca	atgccccaga	aggcagctcc
88501	ccactttaag	ctggtctgac	catattatag	taaagcagga	cagtcacctc	cttttatctg
88561	gacgctctgc	ctctattaat	acaaccttag	aatggcatta	gtttctctta	gcagcctcaa
88621	tgcaactatt	gcttgtttgg	aacaggagtc	caaataaaca	gtagggtgca	atgtgggata
88681	caagaaagaa	cctggacttg	gaaaaaaaaa	aatctgagtt	catgtcctgt	ctgtgaggtc
88741	cagaagaaca	ggaatcccat	atgttttacc	catcattgca	tcctcagagc	ctaccacagt
88801	attagctatg	aattttgccc	aataaacact	tactcaatta	atggtctagg	cattaattta
88861	ctatgggatt	atgggcagtc	ccttccccct	tctgagggag	ggaaatgaaa	gtcttaagtt
88921	aatttagtaa	tctttaaagt	gaaatgcttg	taccctaagg	gataagcaag	tcaaccaggt
88981	ccaaagttcc	atthtatatg	gtatcatctt	ctttaaaaaa	agaaaaagaa	aaaacacctt
89041	gactaatatt	taatacactg	tcacctctct	ccgtgagtc	catatcatat	atggtctgtc
89101	ccttgcaagt	ctaaggaaca	gaagaatttt	tcatacaacc	actgtctatt	tgagcaccaa
89161	ggtttttttt	tagtaatctg	ttcagtttca	tctgctttat	gtcactgaaa	ccagttggaa
89221	aggtgatttt	agaatcctaa	ctctgtggct	tagtagagaa	gctctctgtc	cattcactca
89281	tcatttcaac	aattacttat	tgagcactga	ctccgtgKa	ggcaccagtc	tgggtgctga
89341	ggaattatca	gcaataaaaa	cagacaaaaa	tccttcatgg	agcttatagt	ctaggggtga
89401	aagcagagga	ggatggtggg	gaacacataa	tttcaggtaa	tcaaaaagtc	tatgcacaaa
89461	aggccccaag	cataaggagc	tatttttagcc	aagacctgaa	agaggtgagg	gaactagcca
89521	tgaaggaaga	tgaagggaag	acattctttg	cagagagaac	agtaagggca	gaggccctaa
89581	ggctgaaaca	ccgagccagc	ctccagccct	ccaaatagct	ctccagcatg	aaagggccaa
89641	ggccttctact	ggggacctca	gaagggtttg	ggggctcRgc	accttccctc	caaggtcacc
89701	acccccaaga	caaaaactgt	ttcatcagga	atcctcaaa	accctcccaa	gtccacacac
89761	catgctccgt	gggtccttgg	cgctgccagg	tgactacgac	cataccaccc	gtctcccaga
89821	atgtaaatga	aagatcagag	tgagaaagga	ttaacagcaa	caccaccatg	cttgaatcgc
89881	ctccttgtca	ggcactgcat	taaatgtttc	agatatacaa	tcttggagga	gctgcacagt
89941	aactctaaca	tgcatactaa	tctcatctgc	atthttacaag	ggagaaactg	aggctcaggg
90001	cgtttaagta	actcagccac	gatgaMccgg	ccRcaataag	agccaagatg	caaagtcagc
90061	cctgcctgct	gtgactctga	ccccaccat	actcacacag	ccaggacaca	gagScagagg
90121	ggcagacagg	gagttcaaat	ctctttgtag	ggcagcacca	tgctatcagg	tcacctctgg
90181	gcagtttccc	ttgccctgca	gcataagaac	caataaggac	ttgtccaaga	gcgtccatag
90241	gatggaatgg	gccagaaaga	aaaacaaagt	tctgatgaga	aggacctctt	ctcccaaaga
90301	ctgacagata	caagatgaat	acaccRtgtg	ggaggcaccc	acgcccgtct	gagcctgcga
90361	ggcaaaaggac	agctacccac	actcccatca	caagtcacat	cccggttag	gggtgacttg
90421	tttttaacct	gaaagggtcag	tgttctacag	catagcacaa	agYgcagatg	tttccaccga
90481	actaagaaac	agtgtggggg	ctgcacttag	cactggaaact	ggcacatagt	aaagtactca
90541	aaaatgtYgg	cagacattgg	gggtccttcc	cctctgtctg	cctctgtcct	cacgaggtct
90601	gccacctgtg	acagcatgtg	tctgactggt	gcgggcattg	cccatctggc	tgggaacttc
90661	ctgaggcagg	agcgtacttt	gcacatcttt	gtattcctgt	cgggagcaca	ggaggggtgg
90721	ccttccttga	gagctgcttg	gagttcaaga	acagtgaaac	agagggctac	aaggggcctg
90781	gagcacctt	gcatagacaR	ggcagcagtg	tcctggttct	tgtccaccat	tatggatKca

90841	ccctaaatgg	aactcacagt	caacaccaca	tgaaggcatg	gggaatttct	tactcaatgt
90901	ctgccttgct	ctgtagatta	gaggctgcat	gaggacaggg	agcaagtcca	tcctgtgtgc
90961	cagggatctt	tcagagtggc	ccagagtagg	gcctcggtaa	accttgaatt	cagagaagtc
91021	agactgaagg	gaacaagccc	ttgaccccca	ccccgcctcc	tgcaaggcca	tgccaacat
91081	cccagagaaa	gcctaaccct	gacccactga	ccagacgcac	ttggacgccc	agacacttct
91141	agaatccagg	ctgggcccagc	catgctccct	cagagagggc	cagatgtaag	gcgaagggac
91201	aaagcaggat	gcaggatgtg	ggaactgaaa	cccacccccc	gtcctccaaa	acacgcaaca
91261	ctcagtttct	cttggcgctg	gggagtcac	gggaaagggg	ttcatgggaa	acaaaaagtg
91321	ggcagacaga	gctatgctcc	cctactttag	cctcaggggg	cagagcttgg	ggagaaaaga
91381	aggcagtggt	cagagggaga	gcaggagaaa	tatcctattg	tgggaaaacc	ctctctggag
91441	atcagaggag	ccaccctctg	agggcctgga	cttctggagg	aaagaaagac	aaagagggaa
91501	acagggaatt	tcctaagttct	gctgacctca	tgcccagatg	gtcagcggca	gtccctggat
91561	gaccactggg	cagacgggaa	ctctccctct	gatcaatgag	gtttttataa	cttctccag
91621	agagaggact	cattctcagg	atgacagagc	tgagggggac	tctccaaggg	caatgaggcg
91681	aatcctgcat	tatcaggttg	gagagagatg	caccagaaaa	cactcaatgg	atgaggggct
91741	gcattcgaac	atgacgatgg	catgactccc	cctctgctgt	ccacaaaacca	cgaggatggt
91801	ttcaaagggg	aaaaggaagc	actgaccact	cccctccatg	tggcagtatc	tgaggttcag
91861	agcccaggag	tcctcgggca	tgagctcatc	tgattctcac	tcacggcaca	ggcagtgacg
91921	caaggcaagg	ccctgagcag	ggaaggccaa	ggtcacaaag	gagtcaggat	ggagctggga
91981	ccagaagatc	cctgctctcc	ctccaggctg	cccacagccc	atcctccatt	tccttctctg
92041	cccagcaatc	ccatggcaca	ccacaggccc	ccaccacatc	ttctcRgagt	ctctttccac
92101	ctggcctggt	tcacaaaact	acaaatcagc	aggtgctcca	ccagcagtg	gactccagcc
92161	ccgcttgccc	aaaccagaaa	cagctggtgg	tatagaagca	gccagcgag	actttcttcc
92221	aaaacaagac	ctcagccagc	ggggcctcca	cagcctgccc	cagagggggc	ctggggctgc
92281	ccgctggaac	cagaaaaggcc	cagtttgggg	gcagaaaagg	gcccagacag	acggcaggtc
92341	aggcaacaac	cacagaccgt	gaagatggaa	gtgatgctgc	tgaaaaccgaa	ggagccaccc
92401	actagcaggc	aagcacttgt	gggtggcagg	gaggcagtag	tcctccaggg	tcaactctca
92461	gccttaccct	agaaaagagag	gggtatccata	aagactacat	tcagaattaa	atttacttcc
92521	tagcttttgc	tctgaaatgc	tttggctctgt	cagattatct	tcctattagc	agtgttctgg
92581	tggtctgggt	gggggggtgt	cccagacccc	ccaaatgata	ttcacttgca	tagccactaa
92641	catttgcaaaa	atacttcata	gtgtcccaag	cattgttttt	ccatctgatt	atcacaacag
92701	ccctgggaag	aaggcagggc	tgatacctgc	ctgatggata	aggaaactga	agtccagctt
92761	ggggacttaa	tcagcccaat	ttaatgcctt	tggtcactgg	ctgcatcctg	gggccagcta
92821	tccttgcaac	cctggagcag	gtgatgccct	ccctggccca	gagggaaaag	tgtaagcaaa
92881	tctctggtac	agggaggtgg	aaggtcatcg	aggccaacat	ctacctcccc	agcagaggtg
92941	agggctgcca	gggatgctgg	cagggtgggt	ggcagagggg	gtatagggaa	ggggctccca
93001	ggaaaagacg	cacagaacag	aacgtcagag	aggtctattc	tagtgtctac	tctgctgtgt
93061	atggaacctc	gggctcattc	cctcacatgc	aaggggagga	gcattggcca	cacagaaaac
93121	gggtgatggc	taaagctggc	ctcaggtatca	agaagaccca	agtctcagga	gctagcagca
93181	agctgaggaa	agagagagag	ccagcaccat	ggaaacatcg	ctgccttgga	ggcaggaaga
93241	aaggctccaca	cagggaaagt	gctcaaggcc	aaccttgcca	acacgaggcc	tgagaggggg
93301	cctcacctgc	actagcctca	gctctgtcca	ccctgtgggc	tgtagaaacc	tgtagcagcc
93361	actcaccttt	cctgagcctc	aggtgcctca	tctgtaaaag	aggagtaata	atagaacctc
93421	cctgatagaa	gatcaaaaga	attaaatgaa	acaatatgtg	tatagtggga	agggaattct
93481	cactttctac	tttaggcaat	acttcctgat	tatctgattt	aacaagaaac	acatctttgt
93541	tttataataa	gatttccaaa	ataataagag	tatacagtaa	ctagctcagc	atttgacaca
93601	cagcaggtgc	ttaataaaaag	gctgaggcaa	ccccacaaact	gtgcccagct	tatctaaggg
93661	ccaaggcttt	ccccatttgt	tctctccttt	aatgggattt	taggctcttc	cgtagctca
93721	gtaagctagg	ttctggcctc	cacttattct	ctagtacact	gcataccacc	atttaactgt
93781	ggttaagcag	gggtgcctgga	cacaccatag	ctagtgaaca	tgtagctata	agaagccctt
93841	gaaccacgat	gccacactca	ccaacaactg	ggaatctgag	cctcatttcc	tctgctgtaa
93901	agggcaatat	cctgcaattc	cacccaagga	tgaaaggaag	tgagaYgcca	tgatatcaca
93961	ttgcagacat	aaacaaaaaa	ctgtccacat	atttgtgtta	tgatgacctc	cagtcctccc
94021	caaccaattt	ccaggctggg	gaaactgcag	cctcaggtcc	atccatcaaa	ggccgggttg
94081	gatttttcag	gcagtgaaac	tactctgttc	aatactgtaa	tggtggacac	ctgccattcc
94141	acattttgtc	aaacccatag	aacatacacc	accaagaggg	aacactgatg	taaaccatgg
94201	actccgggtg	acagtgggtg	caatgtagat	tcatacaact	taaaaaatct	accactgtat
94261	tggaaggatg	tgataatggg	ggaagctatg	cctgttaggg	gtgggggggg	cgcagtatat
94321	gtaaaatctc	tgtaccttct	tctcaatttt	gctgtgaacc	taaaactgct	ctataaaaaa
94381	taaggtcttt	aattttaaaag	agaaaaggac	caggctgggc	tctcctgatg	gctgtcaggt
94441	tcacacatga	gtgaggacac	agcacatact	tgagacagtg	tgtattcaag	gaccgcaccc

P A T E N T
Docket SEQ-4095-PV

94501 tggcatcctc accaacaag agccagact taactcctcc atccttgcaa tcaactgagc
94561 aacaatgagg ctgcagacac agagtctcat atagtaacag ctggggcgcc agaactgtgg
94621 gatctagtca aggtacacta gggcgaacat ctaaccctc actagycctc agttacctaa
94681 aaagaggagg ctgcaaaaat agtaataaca tggggggttg tgcgggataa tcattaaggc
94741 cccttccagt tctaaccattt caggatctga aatttattag cactactttc tttaaccttc
94801 taaccttaag aaggctccaa tccccagctc caatcccttc taaggccccag gtggatttcc
94861 ctaaccctac agtctcccca taagagcttt cataggtgct atccccctcc cgagggcagt
94921 cagagacctc cagctgacat cgcagacct gtgcaggctc ctccccctct gcctaacttg
94981 taccaggctc tggccaagcc tgatctgtgt tctcaacat ggcacacatc tccccatgtc
95041 cttcatcctc ccctcccgag tcaccacaaa agaaggcccc actgtctcca ctcagctcc
95101 gaggccccaga ttacacacca cccgctaacc acctgagcca gaattcacac tgcaaaagag
95161 gactggagag cacctaacta agctggagag aggggtgacag ttcgttaggc gctaccgtat
95221 gccagggtgct gggccgcac atgacgcaca tgacctcatt ttcttcttgc cacacagata
95281 tggaaattat catccacact ttccagcaag gaaaccagtc gacgcagcta catggatgag
95341 gaagcagact cagagaagtY aagtcatttg cctgagaata cacagctggg tagtggtaga
95401 acaataatg cagcctcaat ctgtcagatt ccaacatcag tgccctttcc actgctctac
95461 actgcctgga gaggcggcag gctgaagctc agagggtgga aaccagacct actttccagt
95521 tctccagaac gtgccccaa ttcctagccc ctgcctttat atgtctctag ctttatatgc
95581 aaccagggtg caatctgccc cacatcacct gcagtcaaca gggtttagaa tctcaggctg
95641 gaaggagctc cagaggacat tccatcctgt gcttaccag tccctctgagg agccccagga
95701 ctccagctgg ccaactttag caatccagat ctcaccaact tccctcccaa aacaattcct
95761 ggggcagcca gcactggcta cagttaggct gctcccagtt ctgtttccac tggcccttct
95821 tccccctctg tggctcccct gaataaggaa caagatgccc atcttcagca tgacagccag
95881 ccctgaggac atttggaacc tgcagcttcc tctatactgt tccacatagg gactgcccc
95941 cctccagctc cccaccaacc ctctacccca cactatctct agttggttct agcactggac
96001 ccaacattcc aggcattggt tgcctgacca aatgcaggct ttcacctcca cccttttagg
96061 tagtatattc ctattgagg agcctgggta tacatttgct tttcttacag ctgagtccac
96121 tactgaagaa tgtcctttct caatgacaac aacctgcatg tatgcctaac tgggtagaac
96181 aaagtctcta tgtagaacag tgtgcttgag ggtgggtgc ggtggctcat gcctgtaatt
96241 ccagcacttt gggaggccga ggtgggcgga tcacctgagg tcaggagttc gagatcagcc
96301 tggccaacat ggcaaaaccc agtctctact aaaaatacaa aaattagcca ggtgtgtggg
96361 cgggtgctgt tagtcccagc tactggggag gctgaggtag gagaatcgct tgaacttggg
96421 aggtggagat tgcagtaagc cgagatcacg ccacagcact ccagcctggg agacagagtg
96481 ggactccatc tcaaaagaaa aaaaaaaaaa aaaaggggtg tttgaggagg tgtgagttac
96541 ctaagggggc agaagtaact gattgattca gtaatMccct atctaggaat ctagagatct
96601 ttgcatcagt acacagaagc tggacaaaaa tatgcactgc cacatgcttt gtaatagaca
96661 tttttgctat tcttgaatgt ccatcaagaa gggactgggt aaacaaacca ccattcatc
96721 Ratggaatac tatacagcca tcaaaaagaa tggggtagat tgcttggcaa tgatagagaa
96781 agatgcccat aaaatacaaa gcaaagtgc gatttatatg tgtaacagga tgctattttt
96841 ttcaaaaaca cattgtgtgt gtgtgtgtat acatacggaa tcttaaatgt gcatagaaaa
96901 aggcctggaa gcccagtgct ttgggaggcc aaggtgggag gattgcttga ggccagggtg
96961 tcaagaccag cctgggcaaa aagcaagaat agattctcta ttaaaaaaaa acttttttac
97021 attagcagag catggtggca catgcctgga gtcccagcta ctcggaagt tgagggtggg
97081 ggatcacttg agcccagcag ttcaggctac agtgagctat gatcatgcca ctgaactcca
97141 gcctgagtga cagactaata ctctgtctct taaaaaaaag aaaaagaagaa aagaaaaaag
97201 tctcaaaagga tacataccaa actgctacta gtagactgct ctacagaagg acctcggtaa
97261 ggaactaaaa ccaaaagaaa cttttatttt acctatgcta ttttaactct ttacatggga
97321 aatctagtcc tgttcttata caattataaa attagttttt aaatacagta gggacagagg
97381 aagggggaaag gaaggagaga gaagacaact gtcatttttt acattatata ttttgtactg
97441 cttgagtttt ggggggtttt tccccataaa tcatgtgcta tttggtaatt ttttttaaag
97501 ggaattttta aaatattttt ctaaaaaatt taagttagct gagtgcagtg gtgcatgcct
97561 gtagtcccag ctactccaga gacagacgca ggaggatggc ctgaaaccag agtttatcta
97621 accctgtaac tcccctgcct ccaagaggta agatgccaat tttggggaat tcccttata
97681 caaaatatgg tggaaagagg gtttcacaga ttcaaactct ggctatgatc ccttctcgaa
97741 tgacctggg taggcctcac tttccttgtt tctccctatg gaaatgttat gaggaccaag
97801 taggaaccat agagtctct gtaaacctta aaatgctacc cagacaggag cagtaatggc
97861 tgccaaggag ctaggaaagga aaaggggctg gacaggggct gaggtactca gatgaaagcc
97921 aaagatgcct tgtgttaaca acaaaaagct gaaagctacc taaaatgaag agaaaaatga
97981 ataaatatcat tgttgcaatt tcctatcagg aaatactata cagcagtgaa aaaagaatga
98041 gccacagctg gagatacgaa catgaatgaa tctgggtctc actctgttgc ccaggctgga
98101 gtgcagtgcc atgatctcag ttcactgcaa ctccacctc ccagcccaa gtcactctcc

```

98161  accttagcct ctcaagtagc tggaaactaca ggcatgcgcc accacaccca gctaattttt
98221  gtattgtttg cagagatggg ttttggccat gttgcccag ctggtctcaa actcctgggc
98281  tcaagagatc cacctgcctg ctctgcctcc caaagWgcca glaaggcatg agtcaccacg
98341  ctacgcctaa ataacatttt taaacataaa aaaatactat gtattattta gggatgcaca
98401  cattaataaaa aaaactttta agaaatgcaa gaaaaaaacc ccactaaatt cagaacactt
98461  gtttcttggt ggtggctgat gaaggagaaa tttcaaStga ttggaaatgt gttatttctt
98521  aaaccagatg agtgagcatg taggtgcctg cgtgttacc tcggtatctg agagactcct
98581  tcaatttttc ttttttcttt ttactgtatt gtttgccttt tttctgcttc aacttttatt
98641  tttagattcgg ggggtacatg tgcaggtttg ctacctgggt atactgcgtg atttgggtag
98701  ggggtgatccc atcacctggg tactgagcat agtcccaac agtttttcaa ctctgcctcc
98761  ctccctcccc actctagcag tccccagtg ctactgttgc catctttatg tccatgagga
98821  cctgatattt agctccactt ataagtgaga aaatgcagca tttggttttc tgttctgtg
98881  ttaatgtgct taggacaata ttttctaata gtctatgttg ccagtttcct gaggaccaga
98941  tcacgcagga gttgcacctg cagagacaga agtgggctgg agagggacca gggctcctaa
99001  gctctgctgt gaagctgact atagcgaagg caaaggacaa gtggcctgaa ggccaacaga
99061  tgaggtccct gggagagaag agttcagctc cagtggtgag gagactgagc caaaggccct tgactcatag
99121  ggcagtccca tacctgccct ggcctctcag catgactcct tggtagacac actcccacag
99181  caccacacac cctacaccca cctacccac acacacaccc ctgctggggc tgcccgggtt
99241  gtccactgtg taggtgctca aggacgcaga gctcctgcct ctcaaggaac agcctcaggg
99301  tgaggtccct gggagagaag agttcagctc tgcccagagc agccctcaga caaacagcca
99361  gctgctgctc accagtcatc cRttccaatc tgaagagtga ctgtcctggg ccagtcatgg
99421  gaaaatcatc aagaacttcc cRcaatggtc atggtggccg ccaaggtcct tctctggggg
99481  ttgggagctg tgctcccca caaaacaagg ggacccagct gccctgtgcc ttctgtggc
99541  aactctctgg aggatgcctg gataccctcc ctacagacg ccagggatag gagggcagg
99601  cactgcaggc atgtgggggc atagcagcaa gaatctagga gggcaggcac agcaaggcct
99661  ggcccagagg gaaaccagga gctgccagag ccaagagag ggtgacccaa tcattggtt
99721  ttatagagt tttaagactt ggaagagaat gccctgagat gccaNagagt gaaacattt
99781  cattctaaag ctgggaaacc aaagtgcgca aaggcgaaca gacgtgcca cagccatg
99841  ggacagcagt ggcacagaag aaatgcacac ctgctcctc ggtggccact gtgcactctc
99901  ttaccacacc atgctactgc tcaacctctc ccctccctc acagtgggtca ggtaagcaat
99961  gagggaaaaat gatggagggtg agaaagggaag aaccgggct

```

Following is a *CETP* coding nucleotide sequence (cDNA, SEQ ID NO: 6).

>gi|4557442|ref|NM_000078.1| Homo sapiens cholesteryl ester transfer protein, plasma (CETP), mRNA.

```

1  gtgaatctct ggggccagga agaccctgct gcccggaaga gcctcatggt ccgtgggggc
61  tggggcgaca tacatatacg ggctccaggc tgaacggctc gggccactta cacaccactg
121  cctgataacc atgctggctg ccacagtcct gacctgggcc ctgctgggca atgccatgc
181  ctgctccaaa ggcacctcgc acgaggcagg catcgtgtgc cgcacacca agcctgccct
241  cctggtgttg aaccacgaga ctgccaaagt gatccagacc gccttcagc gagccagcta
301  ccagatatac acgggcgaga aggccatgat gctccttggc caagtcaagt atgggttgca
361  caacatccag atcagccact tgtccatcgc cagcagccag gtggagctgg tggaaagcaa
421  gtccattgat gtctccattc agaacgtgtc tgtggtcttc aaggggaccc tgaagtatgg
481  ctacaccact gcctgggtggc tgggtattga tcagtccatt gacttcgaga tcgactctgc
541  cattgacctc cagatcaaca cacagctgac ctgtgactct ggtagagtgc ggaccgatgc
601  ccctgactgc tacctgtctt tccataagct gctcctgcat ctccaagggg agcgagagcc
661  tgggtggatc aagcagctgt tcacaaattt catctccttc accctgaagc tggctctgaa
721  gggacagatc tgcaaagaga tcaacgtcat ctctaacatc atggccgatt ttgtccagac
781  aagggtgccc agcatccttt cagatggaga cattgggggtg gacatttccc tgacaggatga
841  tcccgtcatc acagcctcct acctggagtc ccatcacaaag ggtcatttca tctacaagaa
901  tgtctcagag gacctcccc tccccacctc ctgcccaca ctgctggggg actcccgcac
961  gctgtacttc tggttctctg agcagctctt ccactcgctg gccaaaggtg ctttccagga
1021  tggccgcctc atgctcagcc tgatgggaga cgagttcaag gcagtgtggt agacctgggg
1081  cttcaacacc aaccaggaaa tcttccaaga ggttgtcggc ggcttcccca gccaggccca
1141  agtcaccgtc cactgcctca agatgcccaa gatctcctgc caaaacaagg gagtcgtggt
1201  caattcttca gtgatgggtg aattctctct tccacgccca gaccagcaac attctgtagc
1261  ttacacattt gaagaggata tcgtgactac cgtccaggcc tcctattcta agaaaaagct
1321  cttcttaagc ctcttggtt tccagattac accaaagact gtttccaact tgactgagag
1381  cagctccgag tccatccaga gcttctgca gtcaatgatc accgctgtgg gcatccctga

```

```

1441 ggtcatgtct cggctcgagg tagtgtttac agccctcatg aacagcaaag gcgtgagcct
1501 cttcgacatc atcaaccctg agattatcac tcgagatggc ttcctgctgc tgcagatgga
1561 ctttggtctc cctgagcacc tgctggtgga tttcctccag agcttgagct agaagctctcc
1621 aaggaggctc ggatggggct tgtagcagaa ggcaagcacc aggctcacag ctggaaccct
1681 ggtgtctcct ccagcgtggt ggaagttggg ttaggagtag ggagatggag attggctccc
1741 aactcctccc tctcctaaag gccactggc attaaagtgc tgtatccaag

```

CDS: 131-1612 base pairs

Signal peptide: 131-181 base pairs

Mature peptide: 182-1609 base pairs

PolyA signal: 1771-1776 base pairs

Following is a second *PROL4* cDNA sequence (SEQ ID NO:7). >gi|6005801|ref|NM_007244.1|
Homo sapiens proline rich 4 (lacrimal) (PRR4), mRNA

```

1 cagagcctcc ttcaagatgc tgctgggtcct gctctcagtg gtccttcttg ctctgagctc
61 agctcagagc acagataatg atgtgaaacta tgaagacttt actttcacca taccagatgt
121 agaggactca agtcagagac cagatcaggg accccagaga cctcctcctg aaggactcct
181 acctagaccc cctggtgata gtggtaacca agatgatggt cctcagcaga gaccaccaa
241 accaggaggc catcaccgcc atcctccccc acctcctttt caaaatcagc aacgaccacc
301 ccaacgagga caccgtcaac tctctctacc ccgatttctt tctgtcagcc tgcaggaagc
361 atcatcattc ttccggaggg acagaccagc aagacatccc caggagcaac cactctggtg
421 atctagaatt cagtggcaga aaataaataa gaagataact tccttcagaa agccatgaca
481 ttgaaataat gtggtcataa ctcttttc

```

CDS: 17..421 base pairs

PolyA signal: 442..447 base pairs

Following is a *GRID2* cDNA sequence (SEQ ID NO: 8). >gi|4557632|ref|NM_001510.1| Homo sapiens glutamate receptor, ionotropic, delta 2 (GRID2), mRNA.

```

1 atggaagttt tccccttgct cttgggtttg tccgtctggt ggtctcgaac ctgggactcg
61 gcgaatgcgg attcgatcat tcacatcgga gcaatttttg atgaatctgc caaaaaggat
121 gatgaggtat ttcgcactgc ggttggtgac cttaccaga atgaagagat cttacagact
181 gagaaaatca cattttcagt gacgtttgtt gatggcaaca accctttcca agcagttcaa
241 gaagcctgtg aacttatgaa tcaaggcatc ttggccctgg tcagctccat tggctgcacg
301 tcagcaggat ccctccagtc tttggcagac gccatgcata tccccacct cttcattcag
361 cgctcaacag ctgggacccc aaggagtggc tgtggactca cccggagcaa caggaatgat
421 gactacactc tctcagttcg cccacctgtc tacttgcatg atgttatcct aagagtggtc
481 acagagtatg cctggcagaa attcattata ttctatgata gtgaatacga tatccgtgga
541 atacaggagt tcttggacaa agtctctcag cagggaatgg atgttgcaat tcagaaggta
601 gaaaacaaca tcaataaaat gattaccact ctctttgaca ccatgagaat agaagaactg
661 aatcgctatc gagacactct taggcgagcg atccttggtt tgaatcctgc tacagccaaa
721 tccttcatta ctgaggttgt ggagactaat ttggttgctt ttgactgtca ctggatcatt
781 ataaatgagg aaataaacga tgtggacgta caggaaactg taagaaggtc aattggaagg
841 ttaacgatta ttccgcagac atttccaatt cccagaaca taagtcagcg gtgtttccgt
901 ggcaaccatc gaatatcttc aacattgtgt gatccaaagg atccatttgc tcagaatatg

```

```

961 gagatttcca acctttacat atatgacacg gtgcttctgc ttgctaattgc ttttcataag
1021 aagctggagg accgaaagtg gcacagcatg gcaagtctgt catgtatcag aaagaactca
1081 aagccctggc aggggtggcg ctccatgttg gagaccatca agaagggtgg agttagtggg
1141 ttgactggag agctagaatt tggagaaaat ggaggcaatc ccaatgtcca ctttgaaatc
1201 cttggaacca actatggaga agagcttggc agaggtgttc gaaaacttgg gtgctggaat
1261 cctgtcacag gtctgaatgg gtcactgact gacaagaaat tggagaataa catgctgga
1321 gtggttctac gtgtagtaac tgttctggaa gaaccttttg tgatggtctc tgaaaatgtc
1381 ttgtgtaagc cgaagaaata ccagggtctc tccattgatg ttttggatgc cttatctaac
1441 tacctgggtt ttaactacga aatttacgta gcaccggatc acaaatacgg aagcccacaa
1501 gaagatggga catggaatgg ctggtagga gaacttgtct ttaagagagc cgacataggg
1561 atttctgctt taaccatcac tccagatcgt gaaaatgtgg tggactttac gacacgttac
1621 atggactact cagtgggggt actacttcga agggctgaaa agacagtgga tatgtttgac
1681 tgtcttgcat catttgatct ctctctatgg gcttgcatg ctggcacagt ccttctggtg
1741 ggtctactgg tctactctct gaactggctt aatccccac gattacaaat gggatcaatg
1801 acgtctacta ctctctacaa ctccatgttg tttgtgtatg gatcctttgt acaacaaggc
1861 ggggaagtcc cgtacacgca tctggctacc cgaatgatga tgggggcttg gtggctattt
1921 gctttgattg ttatctcatc ttacacggca aacctcgctg ctttctcac tattacacgc
1981 attgaaagt ccacccagtc tctccaggac ctttccaagc aaacagaaat cccttatggc
2041 acagtccctag actctgcggg atatgagcat gtcgcgatga aaggactgaa tccttttgag
2101 agggacagca tgtattccca aatgtggcgg atgatcaacc gaagcaatgg atcggaagac
2161 aatgttcttg agtcccaggc aggcattcaa aaggtaaaat atggaaatta tgctttcgta
2221 tgggatgcag ctgtattgga atatgtggct atctatgacc cagattgttc cttttacacc
2281 attggaataa ctgttgctga tcggggatat ggaattgcat tacaacatgg cagtccttac
2341 cgagatgttt tttcacaagg gacccgtggg atccagcaga atgggtgacat ggacatcttg
2401 aagcacaat ggtggcctaa gaatggccag tgtgacctgt actcgtcagt ggacacaaag
2461 cagaaaggag gcgccttgga cataaagagc tttgcagggg tcttttgtat cctggctgct
2521 ggaattgtcc tctcctgctt catagccatg ctggagacgt ggtggaacaa gaggaaaggc
2581 tcccggttcc catcaaaaga ggatgacaag gaaattgacc tggagcacct ccatagacgt
2641 gtaaatagct tgtgcacaga tgacgacagc cccataaac agttttccac ctgctcaatt
2701 gatttgaccc ctctggacat tgacactttg ccaacacgac aagcactgga gcaaatcagt
2761 gatttcagga acactcatat taccacaaca acctttatcc cagagcagat ccagactctt
2821 agccgcacac tgtcagctaa agctgcttct ggtttcactt ttggcaacgt gcctgagcac
2881 cgaaactggc cttttaggca cagggcacct aatgggggct ttttcaggag tcctataaaa
2941 acaatgtcat ctattcctta tcaaccaact cctaccctgg ggctcaatct gggtaatgat
3001 ccagaccgag gcacctccat atga

```

Following is a *PDE4D* cDNA sequence (SEQ ID NO: 9). >gi|46361981|ref|NM_006203.3| Homo sapiens phosphodiesterase 4D, cAMP-specific (phosphodiesterase E3 dunce homolog, Drosophila) (PDE4D), mRNA.

```

1 ggaattcatc tgtaaaaatc actacatgta acgtaggaga caagaaaaat attaatgaca
61 gaagatctgc gaacatgatg cacgtgaata attttccctt tagaaggcat tcctggatat
121 gttttgatgt ggacaatggc acatctgcgg gacggagtcc cttggatccc atgaccagcc
181 caggatccgg gctaattctc caagcaaatt ttgtccacag tcaacgacgg gagtccttcc
241 tgtatcgatc cgacagcgat tatgacctct ctccaaagtc tatgtcccgg aactcctcca
301 ttgccagtga tatacacgga gatgacttga ttgtgactcc atttgctcag gtcttggcca
361 gtctgcgaac tgtacgaaac aactttgctg cattaaactaa tttgcaagat cgagcaccta
421 gcaaaagatc acccatgtgc aaccaacat ccatcaacaa agccaccata acagaggagg
481 cctaccagaa actggccagc gagaccctgg aggagctgga ctggtgtctg gaccagctag
541 agaccctaca gaccaggcag tccgtcagtg agatggcctc caacaagttt aaaaggatgc
601 ttaatcggga gctcaccat ctctctgaaa tgagtctggtc tggaaatcaa gtgtcagagt
661 ttatatcaaa cacattctta gataagcaac atgaagtgga aattccttct ccaactcaga
721 aggaaaaagg gaaaaagaaa agaccaatgt ctcagatcag tggagtcaag aaattgagtc
781 acagctctag tctgactaat tcaagtatcc caaggtttgg agttaaaact gaacaagaag
841 atgtccttgc caaggaaacta gaagatgtga acaaatgggg tcttcatgtt ttcagaatag
901 cagagttgtc tggtaaccgg cccttgactg ttatcatgca caccattttt cagggaacggg
961 atttattaaa aacattttaa attccagtag atactttaat tacatatctt atgactctcg

```

```

1021 aagaccatta ccatgctgat gtggcctatc acaacaatat ccatgctgca gatgttgctc
1081 agtctactca tgtgctatta tctacacctg ctttgagggc tgtgtttaca gatttggaga
1141 tctttgcagc aatttttgcc agtgcaatac atgatgtaga tcatcctggg gtgtccaatc
1201 aattttctgat caatacaaac tctgaacttg ccttgatgta caatgattcc tcagttcttag
1261 agaaccatca tttgctgtg ggctttaaat tgcctcagga agaaaactgt gacattttcc
1321 agaatttgac caaaaaacaa agacaatctt taaggaaaat ggctattgac atcgtacttg
1381 caacagatat gtcaaaacac atgaatctac tggctgattt gaagactatg gttgaaacta
1441 agaaagtgc aagctctgga gttcttcttc ttgataatta ttccgatagg attcaggttc
1501 ttcagaatat ggtgcactgt gcagatctga gcaaccaaac aaagcctctc cagctgtacc
1561 gccagtgga gccaccgata atggaggagt tcttccgcca aggagaccga gagagggaac
1621 gtggcatgga gataagcccc atgtgtgaca agcacaatgc ttccgtggaa aaatcacagg
1681 tgggcttcat agactatatt gttcatcccc tctgggagac atgggcagac ctcgccacc
1741 ctgacgcccc ggatattttg gacactttgg aggacaatcg tgaatggtac cagagcacia
1801 tcctcagag cccctctcct gcacctgatg acccagagga gggccggcag ggtcaaacctg
1861 agaaattcca gtttgaacta acttttagagg aagatgggtg gtcagacacg gaaaaggaca
1921 gtggcagtc agtggaagaa gacactagct gcagtgaact caagactctt tgtactcaag
1981 actcagagtc tactgaaatt ccccttgatg aacagggttg agaggaggca gtagggggaa
2041 aagaggaaa ccagcctgaa gcctgtgtca tagatgatcg ttctcctgac acgtaacagt
2101 gcaaaaactt tcatgccttt ttttttttta agtagaaaaa ttgtttccaa agtgcattgc
2161 acatgccaca accacgggtca cacctcactg tcatctgcca ggacgtttgt tgaacaaaac
2221 tgaccttgac tactcagtc ccgcgtcagg aatatcgtaa ccagtttttt cacctccatg
2281 tcatccgagc aaggtggaca tcttcacgaa cagcgttttt aacaagattt cagcttggtg
2341 gagctgacaa agcagataaa atctactcca aattattttt aagagagtgt gactcatcag
2401 gcagcccaaa agtttatgtg acttgggggt tctattcctt tttatttggt tgcaatattt
2461 tcagaagaaa ggcattgcac agagtgaact taatggacga agcaacaaat atgtcaagaa
2521 caggacatag cacgaatctg ttaccagtag gaggaggatg agccacagaa attgcataat
2581 tttctaattt caagtcttcc tgatacatga ctgaatagtg tggttcagtg agctgcactg
2641 acctctacat tttgtatgat atgtaaaaa gattttttgt agagcttact tttattatta
2701 aatgtattga ggtattatat ttaaaaaaaa ctatgttcag aacttcatct gccactgggt
2761 atttttttt aaggagtaac ttgcaagttt tcagtacaaa tctgtgctac actggataaa
2821 aatctaattt atgaatttta cttgcacctt atagttcata gcaatttaact gatttgtagt
2881 gattcattgt ttgttttata taccatgac ttccatattt taaaagagaa aaacaacttt
2941 atgttgacag aaaccttttt tgtaagtctt tattatttac tttgcatttt gtttactctt
3001 ttcagataaa gcagagttgc tcttcaccag tgtttttctt catgtgcaaa gtgactattt
3061 gttctataat acttttatgt gtgttatatc aaatgtgtct taagcttcat gcaaacctag
3121 tcatcagttc gtgtgtgctg aagcaagtgg gaaatatata aataccagat agctaaaatg
3181 gtcagttctt tttagatggt ttctacttta gtatctccta ataactgttt gctgtgtcac
3241 tagatgttca tttcacaggt gcatgtcttt ctataatcc acacatttca tgccttaata
3301 atccacacat ttcagctca tttttattgt ttttacagcc agttatagca agaaaaaggt
3361 ttttccccct gtgctgcttt ataatttagc gtgtgtctga accttatcca tgtttgctag
3421 atgaggtctt gtcaaatata tcaactacat tgtcaccggg gaaaagaaac aggtagttaa
3481 gttaggggta acattcattt caaccacgag gttgtatatc atgactagct tttactcttg
3541 gtttacagag aaaagttaaa caaccaacta ggcagttttt aagaatatta acaatatatt
3601 aacaaacacc aatacaacta atcctatttg gttttaatga ttccaccatg ggattaagaa
3661 ctatatcagg aacatccctg agaaacggct ttaagtgtag caactactct tcttaattgg
3721 acagccacat aacgtgtagg aagtccttta tcaattatcc tcatccata agcatatctt
3781 gcagagggga actacttctt taaacacatg gaggggaaag agatgatgcc actggcacca
3841 gagggtagt actgtgatgc atcctaaaaa atttattata ttggtaaaaa ttctggttaa
3901 ataaaaaatt agagatcact cttggctgat ttcagacca ggaactgtat tacagtttta
3961 gagattaatt cctagtgttt acctgattat agcagttggc atcatggggc atttaattct
4021 gactttatcc ccacgtcagc cttaataaag tcttctttac cttctctatg aagactttaa
4081 agcccaata atcatttttt acattgatat tcaagaattg agatagatag aggccaaagt
4141 ggttatctga caagtggaaa atcaaacggt taagaagaat tacaactctg aaaagcattt
4201 atatgtggaa cttctcaagg agcctcctgg ggactggaaa gtaagtcatc agccaggcaa
4261 atgactcatg ctgaagagag tccccatttc agtcccctga gatctagctg atgcttagat
4321 cttttgaaat aaaaattatg tctttataac tctgatcttt tacataaagc agaagaggaa
4381 tcaactagtt aattgcaagg ttttactctt gtttctctg taaagatcag atggtaattc
4441 ttcaataaag aaaaaataa agacgtatgt ttgaccaagt agtttcacaa gaattttgg
4501 gacttggttt cttttaattt tatttgtccc tgagtgaagt ctagaagaa aggtaaagag
4561 tctagagttt attcctcttt ccaaaacatt ctcatcctc tcctccctac acttagattt
4621 tccccacag agtgcctaga atcttaataa tgaataaaat aaaaagcagc aatatgtcat

```

```

4681 taacaaatcc agacctgaaa gggtaaagg tttataactg cactaataaaa gagaggctct
4741 ttttttttct tccagtttgt tggtttttaa tggtagcgtg ttgtaaagat acccactaat
4801 ggacaatcaa attgcagaaa aggtcgaata tccaagagac agggactaat gcactgtaca
4861 atctgcttat ccttgccctt ctctcttgcc aaagtgtgct tcagaaatat atactgcttt
4921 aaaaaagaat aaaagaatat ctttttacia gtggcctttac atttcctaaa atgccataag
4981 aaaatgcaat atctgggtac tgtatgggga aaaaaatgtc caagtttgtg taaaaccagt
5041 gcatttcagc ttgcaagtta ctgaacacaa taatgctgtt ttaattttgt tttatatcag
5101 ttaaaattca caataatgta gatagaacaa attacagaca aggaaagaaa aaacttgaat
5161 gaaatggatt ttacagaaag ctttatgata atttttgaat gcattattta ttttttgtgc
5221 catgcatttt ttttctcacc aaatgacctt acctgtaata cagtcttgtt tgtctgttta
5281 caaccatgta tttattgcaa tgtacatact gtaatgttaa ttgtaaatta tctgttctta
5341 ttaaaacatc atcccatgat ggggtggtgt tgatatattt ggaaactcct ggtgagagaa
5401 tgaatgggtg gtatacatat tctgtacatt tttcttttct cctgtaatat agtctgtca
5461 ccttagagct tgtttatgga agattcaaga aaactataaa atactaaaag atatataaat
5521 ttaaaaaaac atagctgcag gtcttttggtc ccagggtgtg gccttaactt taaccaatat
5581 tttcttctgt tttgctgcat ttgaaaggta acagtggagc tagggctggg cattttcat
5641 ccaggctttt aattgattag aattctgcca ataggtggat tttacaaaac cacagacaac
5701 ctctgaaaga ttctgagacc cttttgagac agaagctcct aagtacttct tgccaggag
5761 cagcactgca tgtgtgatgg ttgtttgcca tctgttgatc aggaactact tcagctactt
5821 gcatttgatt atttcctttt tttttttttt taactcggaa acacaactgg gggaaat

```

Following is a *GPX3* cDNA sequence (SEQ ID NO: 10). >gi|6006000|ref|NM_002084.2| Homo sapiens glutathione peroxidase 3 (plasma) (GPX3), mRNA.

```

1 agccaaaaga ggaagggacc ggcctccac gtccacaggg acctgacttc cacctctctg
61 cccagatttg cttatgtcac tgtcgccccg ggacggggag gtggggagct gagggcaagt
121 cgcgcccgcc cctgaaatcc cagccgccta gcgattggct gcaagggtct cggcttggcc
181 gcggattaat cacaccgag ggcttgaaag gtggctggga gcgccggaca cctcagacgg
241 acggtggcca gggatcaggc agcgggtcag gcgaccctga gtgtgcccc accccgccat
301 ggcccggtcg ctgcaggcgt cctgcctgct ttccctgtct ctggccggct tcgtctcgca
361 gagccgggga caagagaagt cgaagatgga ctgccatggt ggcataagtg gccaccattt
421 cgagtacgga gccctcacca ttgatgggga ggagtacatc ccctcaagc agtatgctgg
481 caaatatgct ctctttgtca acgtggccag ctactgaggc ctgacggggc agtacattga
541 actgaatgca ctacaggaag agcttgacc attcgggtctg gtcattcttg gctttccctg
601 caaccaattt ggaaaacagg aaccaggaga gaactcagag atccttccta cctcaagta
661 tgtccgacca ggtggaggct ttgtccctaa tttccagctc tttgagaaag gggatgtcaa
721 tggagagaaa gagcagaaat tctacacttt cctaaagaac tcctgtcctc ccacctcgga
781 gctcctgggt acatctgacc gcctcttctg ggaacccatg aaggttcacg acatccgctg
841 gaactttgag aagttcctgg tggggccaga ttgtataccc atcatgcgt ggaccaccg
901 gaccacggtc agcaacgtca agatggacat cctgtcctac atgaggcggc aggcagccct
961 ggggtgcaag aggaagtaac tgaaggccgt ctcatcccat gtccaccatg taggggaggg
1021 actttgttca ggaagaaatc cgtgtctcca accacactat ctaccatca cagaccctt
1081 tcctatcact caaggcccca gcctggcaca aatggatgca tacagtcttg tgtactgcca
1141 ggcattgtgg tgtgggtgca atgtgggtgt ttacacacat gcctacaggt atgcgtgatt
1201 gtgtgtgtgt gcatgggtgt acagccacgt gtctacctat gtgtctttct gggaatgtgt
1261 accatctgtg tgcctgcagc tgtgtagtgc tggacagtga caaccctttc tctccagttc
1321 tccactccaa tgataatagt tcacttatac ctaaacccaa aggaaaaacc agctctaggt
1381 ccaattgttc tgctctaact gatacctcaa ccttggggcc agcatctccc actgcccaca
1441 aatattagta actatgactg acgtcccccg aagtttcttg gtctaccaca ctcccacc
1501 cccactcctt acttcctgaa gggccctccc aaggctacat cccacccca cagttctccc
1561 tgagagagat caacctccct gagatcaacc aaggcagatg tgacagcaag ggccacggac
1621 cccatggcag ggggtggcgtc ttcatgaggg agggggccaa agcccttgtg ggcggacctc
1681 ccctgagcct gtctgagggg ccagccctta gtgcattcag gctaaggccc ctgggcaggg
1741 atgccacccc tctccttctg gaggacgtgc cctcaccctt cactggtcca ctggcttgag
1801 actcaccctg tctgcccagt aaaagccttt ctgcagcaaa aaaaaaaaaa aaaaaa

```

CDS: 299-979 base pairs

Signal peptide: 299-358 base pairs

Mature peptide: 359-976 base pairs

PolyA signal: 1838 base pairs

[0262] Following is a *CETP* amino acid sequence (SEQ ID NO: 11).

>gi|4557443|ref|NP_000069.1| cholesteryl ester transfer protein, plasma precursor [Homo sapiens]

MLAATVLTALLGNAHACSKGTSHEAGIVCRITKPALLVLNHETAKVIQTAFQRASYPDITGEKA
MMLLGQVKYGLHNIQISHLSIASSQVELVEAKSIDVSIQNVSVVFKGTLKYGYTTAWWLGIDQSI
DFEIDSAIDLQINTQLTCDSGRVRTDAPDCYLSFHKLLHLQGEREPGWIKQLFTNFISFTLKLVLK
GQICKEINVISNIMADVFQTRAASILSDGDIGVDISLTGDPVITASYLESHHKGHFIYKNVSEDLPLP
TFSPTLLGDSRMLYFWFSERVFHSLAKVAFQDGRMLSLMGDEFKAVLETWGFNTNQEIFQEVV
GGFPSQAQVTVHCLKMPKISCQNKGVVVNSSVMVKFLFPRPDQQHSVAYTFEEDIVTTVQASYS
KKKLFLSLDFQITPKTVSNLTSSSESIQSFLQSMITAVGIPEVMSRLEVVF TALMNSKGVSLFDII
NPEIITRDGFLLLQMDFGFPEHLLVDFLQSL

Protein: 1..493 amino acids

Signal peptide: 1-17 amino acids

Mature peptide: 18-493 amino acids

[0263] Following is a second *PROL4* amino acid sequence (SEQ ID NO: 12).

>gi|6005802|ref|NP_009175.1| proline rich 4 (lacrimal) [Homo sapiens].

MLLVLLSVLLALSSAQSTDNDVNYEDFTFTIPDVEDSSQRPDQGPQRPPPEGLLPRPPGDSGNQ
DDGPPQRPKPGGHHRHPPPPPFQNNQRPPQGRHQLSLPRFPSVSLQEASSFFRRDRPARHPQE
QPLW

Protein: 1..134 amino acids

Signal peptide: 1-16 amino acids

Mature peptide: 17-134 amino acids

[0264] Following is a *GRID2* amino acid sequence (SEQ ID NO: 13).

>gi|4557633|ref|NP_001501.1| glutamate receptor, ionotropic, delta 2 [Homo sapiens].

MEVFPLLLVLSVWWSRTWDSANADSIIHIGAIFDESAKKDDEVFRTAVGDLNQNEEILQTEKITFS
VTFVDGNNPFQAVQEACELMNQGILALVSSIGCTSAGSLQSLADAMHIPHLFIQRSTAGTPRSGC

GLTRSNRNDYTLSPVPPVYLHDVILRVVTEYAWQKFIIFYDSEYDIRGIQEFLDKVSQQGMDVA
LQKVENNINKMITTLFDTMRIEELNRYRDTLRRAILVMNPATAKSFITEVVETNLVAFDCHWIIN
EEINDVDVQELVRRSIGRLTIIRQTFPIPNISQRCFRGNHRISSTLCDPKDPFAQNMEISNLYIYDT
VLLLANAFHKKLEDKWHSMASLSCIRKNSKPWQGGSRMLETIKKGGVSGLTGELEFGENGGN
PNVHFEILGTNYGEELGRGVRKLCWCNPNVTGLNGSLTDKKLENNMRGVVLRVVTVLEEPFVMV
SENVLCKPKKYQGFSIDVLDALSNYLGFNIEIYV
APDHKYGSPQEDGTWNLVGLVFKRADIGISALTITPDRENVVDFTRYMDYSVGVLLRRAEK
TVDMFACLAPFDLSLWACIAGTVLLVGLLVYLLNWLNPRLQMGSMSTTLYNSMWFVYGSFV
QQGGEVPYTTLATRMGGAWWLFALIVISSYTANLAAFLTITRIESSIQSLQDLSKQTEIPYGTVL
DSAVYEHVRMKGLNPFERDSMYSQMWRMNRSGSENNVLESQAGIQKVYKGNVAFVWDA
VLEYVAIYDPDCSFYTIGNTVADRGYGLAHGSPYRDVFSQRILELQNGDMDILKHKWWPKN
GQCDLYSSVDTKKGGALDIKSFAGVFCILAGIVLSCFIAMLETWWNKRKGRVPSKEDDK
DLEHLHRRVNSLCTDDSPHKQFSTSSIDLTPLDIDTLPTRQALEQISDFRNTHTTTTPIEQITLS
RTLSAKAASGFTFGNVPEHRTGPFRHRAPNGGFFRSPIKTMSSIPYQPTPTLGLNLGNDPDRGTSI

[0265] Following is a *PDE4D* amino acid sequence (SEQ ID NO: 14).

>gi|32306513|ref|NP_006194.2| cAMP-specific phosphodiesterase 4D [Homo sapiens]

MMHVNNFPFRRHSWICFDVDNGTSAGRSPLDPMTSPGSGLLQANFVHSQRRESFLYRSDSDYD
LSPKSMSRNSIASDIHGDDLIVTPFAQVLASLRTVRNNFAALTNLQDRAPSKRSPMCNQPSINKA
TITEEAYQKLASETLEELDWCLDQLETQTRHSVSEMASNKFKRMLNRELTHLSEMSRSGNQVS
EFISNTFLDKQHEVEIPSPTQKEKEKKRPMSSQISGVKKLMHSSSLTNSSIPRFGVKTEQEDVLAK
ELEDVKNWGLHVFRIAELSGNRPLTVIMHTIFQERDLLKTFKIPVDTLITYLMTLEDHYHADVAY
HNNIHAADVQSTHVLLSTPALEAVFTDLEILAAIFASAIHDVDHPGVSQFLINTNSEALMYN
DSSVLENHHLAVGFKLLQEENCDFQNLTKKQRQSLRKMVIDIVLATDMSKHMNLLADLKTMTV
ETKKVTSSGVLLLDNYSQRIQVLQNMVHCADLSNPTKPLQLYRQWTDRIEVEFFRQGDRENERG
MEISPMCDKHNASVEKSQVGFIDYIVHPLWETWADLVHPDAQDILDTLEDNREWYQSTIPQSPSP
APDDPEEGRQGQTEKFQFELTLEEDGESDTEKDSGSQVEEDTSCSDSKTLCTQDSESTEIPLDEQV
EEEAVGEEESQPEACVIDDRSPDT

[0266] Following is a *GPX3* amino acid sequence (SEQ ID NO: 15). >gi|6006001|ref|NP_002075.2|
plasma glutathione peroxidase 3 precursor [Homo sapiens]

MARLLQASCLLSLLLAGFVSQSRGQEKSKMDCHGGISGTIYEYGALTIDGEEYIPFKQYAGKYVL
FVNVASYUGLTGQYIELNALQEELAPFGLVILGFPCNQFGKQEPGENSEILPTLKYVRPGGGFVPN
FQLFEKGDVNGEKEQKFYTFKNSCPPTSELLGTSDRLFWEPMKVHDIRWNFEKFLVGPDGIPIM
RWHHRTTVSNVKMDILSYMRRQAALGVKRRK

[0267] Modifications may be made to the foregoing without departing from the basic aspects of the invention. Although the invention has been described in substantial detail with reference to one or more specific embodiments, those of skill in the art will recognize that changes may be made to the

embodiments specifically disclosed in this application, yet these modifications and improvements are within the scope and spirit of the invention, as set forth in the claims which follow. Also, citation of the above publications or documents is not intended as an admission that any of the foregoing is pertinent prior art, nor does it constitute any admission as to the contents or date of these publications or documents. Each patent, patent application and other publication and document referenced are incorporated herein by reference in its entirety, including drawings, tables and cited documents.

What is claimed is:

1. A method for identifying a subject at risk of low BMD, which comprises detecting the presence or absence of one or more polymorphic variations associated with low BMD in a nucleic acid sample from a subject, wherein the one or more polymorphic variations are detected in a nucleotide sequence in SEQ ID NOs:1-5, a substantially identical sequence thereof or a fragment of the foregoing; whereby the presence of the polymorphic variation is indicative of the subject being at risk of low BMD.
2. The method of claim 1, which further comprises obtaining the nucleic acid sample from the subject.
3. The method of claim 1, wherein the one or more polymorphic variations are detected at one or more positions selected from the group consisting of rs7500979, rs2217332, rs8044804, rs2270835, rs2133783, rs247609, rs952440, rs881598, rs2291955, rs2518054, rs866038, rs1436425, rs173537, rs247611, rs166017, rs173538, rs193694, rs7205692, rs8048746, rs247618, rs183130, rs6499863, rs4783961, rs3816117, rs711752, rs708272, rs1864163, rs4369653, rs1864165, rs891141, rs891143, rs7205804, rs5885, rs1532625, rs1532624, rs289712, rs7499892, rs5883, rs289714, rs158480, rs289717, rs4344729, rs289718, rs289719, rs2033254, rs4784744, rs291044, rs8053613, rs5881, rs5880, rs7198026, rs5882, rs8045701, rs289741, rs1801706, rs289742, rs289743, rs289746, rs172337, rs289747, rs1566439, rs7205459, rs289749, rs289751, rs8059220, rs8058353, rs289735, rs289737, rs291042, rs1875236, rs821466, rs821465, rs4275846, rs289707, rs821463, rs289706, rs1167741, rs2052880, rs1167742, rs1183256, rs1651665, rs1651666, rs4784751, rs1651667, rs8052091, rs1684574, rs1684575, rs1672865, rs821470, rs1549669, rs291040 and rs289754.
4. The method of claim 1, wherein the one or more polymorphic variations are detected at one or more positions selected from the group consisting of rs166017, rs193694, rs7205804, rs1801706, rs7205459 and rs821465.
5. The method of claim 1, wherein the one or more polymorphic variations are detected in a region spanning positions 14,328 to 68,805 in SEQ ID NO: 1.
6. The method of claim 1, wherein the one or more polymorphic variations are detected at one or more positions selected from the group consisting of rs523051, rs693620, rs2588349, rs2588350, rs619381, rs3759252, rs3759251, rs2418107, rs7303054, rs1838345, rs620878, rs2537817, rs1548803,

rs667123, rs1838346, rs2159903, rs3944035, rs3741845, rs2110096, rs759055, rs589377, rs7960194, rs7978242, rs601051, rs4262797, rs2215714, rs1373434, rs2215715, rs612456, rs612808, rs689118, rs597468, rs592864, rs640372, rs7966559, rs654834, rs4763216, rs668521, rs669503, rs3906864, rs3906863, rs7957888, rs9300230, rs7306214, rs763839, rs2418105, rs666841, rs3851578, rs7138797, rs7295252, rs2418106, rs7299578, rs621112, rs3863320, rs1373432, rs1047699, rs1063193, rs2232959, rs2227296, rs1548804, rs2232958, rs2232957, rs2232956, rs1972571, rs3759250, rs3759249, rs1541525, rs2098248, rs2900550, rs7302130, rs4763583, rs4360778, rs1607695, rs1607694, rs2192139, rs7978300, rs7397871, rs4763217, rs2159900, rs10772370, rs7398682, rs2900551, rs2900552, rs2418214, rs2418215, rs965243, rs1117548, rs1520225, rs1520226, rs1520227, rs971919, rs2159901, rs2159902, rs2110099, rs7314847, rs7296003, rs4281556, rs4763219, rs3851579, rs3851580, rs1049119, rs2298866, rs2298865, rs2298864, rs2298863, rs3180393, rs2070837, rs7956204, rs2418216, rs3741844, rs4262798, rs2418217, rs2418218, rs7137492, rs2110100, rs1013312, rs4579993, rs1013313, rs7397106, rs2215716, rs2192140, rs4763589, rs1468697, rs2070837, rs3180393 and rs2298865.

7. The method of claim 1, wherein the one or more polymorphic variations are detected at one or more positions selected from the group consisting of rs2588350, rs619381, rs620878, rs759055, rs4262797, rs612808, rs3906863, rs7957888, rs763839, rs2418105, rs666841, rs3851578, rs7299578, rs621112, rs1047699, rs1548804, rs2232956, rs1520227 and rs2215716.

8. The method of claim 1, wherein the one or more polymorphic variations are detected in a region spanning positions 2,424 to 93,715 in SEQ ID NO: 2.

9. The method of claim 1, wherein the one or more polymorphic variations are detected at one or more positions selected from the group consisting of rs1433661, rs1485009, rs7681947, rs1816432, rs1485018, rs1485017, rs7438397, rs6834311, rs1368717, rs1017391, rs2870701, rs7679839, rs1385404, rs1368716, rs4693316, rs1905707, rs1905708, rs1905709, rs3912442, rs2082553, rs6831638, rs5860329, rs2870702, rs2870703, rs1948016, rs6835836, rs1994253, rs1905710, rs1485019, rs978191, rs1385405, rs7694361, rs1905711, rs1905734, rs1485012, rs1485013, rs4692981, rs7670552, rs7670932, rs7688091, rs7440540, rs2171000, rs2870704, rs7655758, rs7661436, rs7662289, rs7667044, rs7691929, rs5860330, rs901013, rs901012, rs901011, rs1948018, rs2870705, rs1948017, rs1905733, rs1385408, rs1385409, rs1385410, rs1485026, rs1485027, rs2904483, rs1385406, rs1905732, rs2046418, rs2200377, rs1905731, rs1905730, rs975713, rs6820985, rs7670441, rs6810794, rs7676623, rs1154861, rs1032125, rs1485022, rs1485024, rs3913651, rs4693319, rs1872383, rs2200376, rs7668090, rs7692930, rs967096,

rs6822249, rs6532405, rs1017897, rs7672674, rs7694568, rs2904484, rs7340830, rs1485033, rs2870706, rs1905729, rs4693320, rs6848749, rs6532406, rs6532407, rs1905728, rs6819866, rs1905727, rs7674069, rs1905724, rs1905723, rs1485020 and rs6814101.

10. The method of claim 1, wherein the one or more polymorphic variations are detected at one or more positions selected from the group consisting of rs1433661, rs7679839, rs1368716, rs1905707, rs1905708, rs1994253, rs1485019, rs1905734, rs1485012, rs7670552, rs7691929, rs1948018, rs1948017, rs1485024, rs7694568, rs4693320, rs6848749, rs6532406, rs6532407 and rs6819866.

11. The method of claim 1, wherein the one or more polymorphic variations are detected in a region spanning positions 206 to 90,969 in SEQ ID NO: 3.

12. The method of claim 1, wherein the one or more polymorphic variations are detected at one or more positions selected from the group consisting of rs6886495, rs6450498, rs1472456, rs4700315, rs4700316, rs7714708, rs7710479, rs2968013, rs2968014, rs2968015, rs1391648, rs2055297, rs2055296, rs3989138, rs4700317, rs2036220, rs7727206, rs7723432, rs1546221, rs4479801, rs4395595, rs4395596, rs4699932, rs2936201, rs7356672, rs2936200, rs1909296, rs7703131, rs7445308, rs3087748, rs4321723, rs2968016, rs5868151, rs1874858, rs1874857, rs7712922, rs4631140, rs4469166, rs1078369, rs1078368, rs2968006, rs2968005, rs2936190, rs2409613, rs4415048, rs2968004, rs2968003, rs2968002, rs2936191, rs1498610, rs6874662, rs3060393, rs7729722, rs7733884, rs7714489, rs7735570, rs2936193, rs2291851, rs2291852, rs1498602, rs1995166, rs1498603, rs1498604, rs1498605, rs1948651, rs4699934, rs4700319, rs2279737, rs7720361, rs7706419, rs1006431, rs1353747, rs1498606, rs1353748, rs1553113, rs2968012, rs2968011, rs1498608, rs2936189, rs1498609, rs2968019, rs6891238, rs2968010, rs2968009, rs2936203, rs1498601, rs1498600, rs1498599, rs2936202, rs7730070, rs6450501, rs6450502, rs6889456, rs6894618, rs7706044, rs7707541, rs7712076, rs6892860, rs6867053, rs7737269, rs6864156, rs950447, rs2936196, rs7719347, rs1391649, rs1391650, rs1391651, rs1353749, rs10682149, rs5868153, rs1363882, rs2409626, rs2968018, rs954740, rs986067, rs6869400, and rs5010782.

13. The method of claim 1, wherein the one or more polymorphic variations are detected at one or more positions selected from the group consisting of rs7714708, rs1498602, rs4699934, rs1006431, rs1353747, rs1498608, rs1498609, rs2968010, rs2936202 and rs1391649.

14. The method of claim 1, wherein the one or more polymorphic variations are detected in a region spanning positions 1,599 to 82,591 in SEQ ID NO: 4.

15. The method of claim 1, wherein the one or more polymorphic variations are detected at one or more positions selected from the group consisting of rs1478398, rs1478397, rs1160114, rs1160113, rs1382323, rs1160112, rs7709870, rs7710643, rs7730467, rs6579829, rs6579830, rs6579831, rs6896232, rs1351131, rs1038074, rs1478396, rs6880512, rs4958858, rs4958431, rs4958432, rs6898463, rs4958859, rs4130064, rs4130065, rs4133119, rs4958860, rs4958861, rs4437356, rs4958868, rs1478400, rs6889375, rs1600159, rs6875892, rs4608909, rs2345000, rs4516840, rs2054440, rs707141, rs707142, rs841236, rs707143, rs707144, rs6869405, rs707145, rs707146, rs707148, rs707150, rs5872184, rs3763015, rs2042235, rs3763013, rs2042236, rs1946234, rs1946235, rs1946236, rs8177402, rs8177403, rs8177404, rs8177405, rs8177406, rs8177407, rs8177408, rs8177409, rs6888961, rs8177410, rs8177411, rs8177412, rs8177413, rs870407, rs870406, rs6873202, rs8177414, rs8177415, rs3805435, rs8177416, rs3792799, rs3792798, rs3828599, rs8177417, rs3792797, rs8177418, rs8177419, rs8177420, rs8177421, rs4958872, rs3792796, rs8177422, rs8177423, rs4958434, rs8177424, rs8177425, rs8177426, rs8177427, rs8177429, rs6889737, rs3792795, rs8177430, rs8177431, rs4958873, rs8177432, rs8177433, rs8177434, rs8177435, rs3763011, rs8177436, rs8177437, rs4958874, rs8177439, rs8177440, rs8177441, rs8177442, rs8177443, rs869975, rs869976, rs8177444, rs8177445, rs7721469, rs8177446, rs7704191, rs8177447, rs11548, rs2230303, rs7722386, rs8177448, rs8177449, rs2070593, rs8177450, rs8177451, rs8177452, rs8177453, rs8177454, rs3763010, rs8177455, rs8177456, rs736775, rs2277940, rs8177458, rs8177834, rs3924, rs2233312, rs2233311, rs2233310, rs2233309, rs4958875, rs2233308, rs2233307, rs2233306, rs2233305, rs2233304, rs2233303, rs2233302, rs2287719, rs2287720, rs7727034, rs7727250, rs7709800, rs3840312, rs2287721, rs6875293, rs3805434, rs2080982, rs2080983, rs2287722, rs2233301, rs2233300, rs4958876, rs2233299, rs2233298, rs2287723, rs2161359, rs7734456, rs4292439, rs4958878, rs6862024, rs3834819, rs2233297, rs2233296, rs2233295, rs2233294, rs7713028, rs7713223, rs7713567, rs888989, rs2233293, rs3749657, rs2233292, rs2112635, rs871269, rs3792794, rs6579837, rs3805433, rs5872186, rs2233291, rs2233290, rs2233289, rs4958435, rs4958880, rs1422673, rs2042234, rs3805432, rs3805431, rs2233288, rs2233287, rs3815720, rs3792792, rs3792791, rs2303018, rs3792790, rs4958436, rs2233286, rs2233285, rs7732451, rs2233284, rs1422674, rs3792789, rs4562032, rs6865077, rs1559126, rs3792788, rs1559127, rs3792786, rs6880110, rs6861227, rs3805430, rs1862364, rs4958881, rs3792785, rs6869605, rs6870205, rs4246047, rs4958882, rs3792784, rs3792783 and rs5872188.

16. The method of claim 1, wherein the one or more polymorphic variations are detected at one or more positions selected from the group consisting of rs1478398, rs1160114, rs1160113, rs1160112, rs4958858, rs4958431, rs6898463, rs4958859, rs4958860, rs4608909, rs707144, rs2042235, rs3763013, rs2042236, rs8177404, rs8177426, rs8177427, rs8177429, rs3792795, rs4958873, rs8177437, rs869975, rs8177447, rs11548, rs2277940, rs8177834, rs2233311, rs2233302, rs7727034, rs7727250, rs3805434, rs7734456, rs7713028, rs7713223, rs888989, rs3792794, rs4958880, rs1422673, rs3805432 and rs4958436.

17. The method of claim 1, wherein the one or more polymorphic variations are detected in a region spanning positions 231 to 86,539 in SEQ ID NO: 5.

18. The method of claim 1, wherein the one or more polymorphic variations are detected at one or more positions in linkage disequilibrium with one or more positions in claim 3, 6, 9, 12 or 15.

19. The method of claim 1, wherein detecting the presence or absence of the one or more polymorphic variations comprises:

hybridizing an oligonucleotide to the nucleic acid sample, wherein the oligonucleotide is complementary to a nucleotide sequence in the nucleic acid and hybridizes to a region adjacent to the polymorphic variation;

extending the oligonucleotide in the presence of one or more nucleotides, yielding extension products; and

detecting the presence or absence of a polymorphic variation in the extension products.

20. The method of claim 1, wherein the subject is a human.

21. A method for identifying a polymorphic variation associated with low BMD proximal to an incident polymorphic variation associated with low BMD, which comprises:

identifying a polymorphic variation proximal to the incident polymorphic variation associated with low BMD, wherein the polymorphic variation is detected in a nucleotide sequence in SEQ ID NOs:1-5, a substantially identical sequence thereof or a fragment of the foregoing; and

determining the presence or absence of an association of the proximal polymorphic variant with low BMD.

22. The method of claim 21, wherein the incident polymorphic variation is at one or more positions in claim 3, 6, 9, 12 or 15.

23. The method of claim 21, wherein the proximal polymorphic variation is within a region between about 5 kb 5' of the incident polymorphic variation and about 5 kb 3' of the incident polymorphic variation.

24. The method of claim 21, which further comprises determining whether the proximal polymorphic variation is in linkage disequilibrium with the incident polymorphic variation.

25. The method of claim 21, which further comprises identifying a second polymorphic variation proximal to the identified proximal polymorphic variation associated with low BMD and determining if the second proximal polymorphic variation is associated with low BMD.

26. The method of claim 25, wherein the second proximal polymorphic variant is within a region between about 5 kb 5' of the incident polymorphic variation and about 5 kb 3' of the proximal polymorphic variation associated with low BMD.

27. A method for identifying a candidate molecule that increases BMD, which comprises:

- (a) introducing a test molecule to a system which comprises a nucleic acid comprising a nucleotide sequence in SEQ ID NOs:1-5, a substantially identical sequence thereof or a fragment of the foregoing; or introducing a test molecule to a system which comprises a protein encoded by a nucleotide sequence in SEQ ID NOs:1-5, a substantially identical sequence thereof or a fragment of the foregoing; and
- (b) determining the presence or absence of an interaction between the test molecule and the nucleic acid or protein,

whereby the presence of an interaction between the test molecule and the nucleic acid or protein identifies the test molecule as a candidate molecule that modulates BMD levels.

28. The method of claim 27, wherein the system is an animal.

29. The method of claim 27, wherein the system is a cell.

30. The method of claim 27, wherein the nucleotide sequence comprises one or more polymorphic variations associated with low BMD.

31. The method of claim 27, wherein the one or more polymorphic variations associated with low BMD are at one or more positions in claim 3, 6, 9, 12 or 15.

32. A method for treating osteoporosis in a subject, which comprises administering a candidate molecule identified by the method of claim 27 to a subject in need thereof, whereby the candidate molecule treats osteoporosis in the subject.

33. A method for identifying a candidate therapeutic for treating osteoporosis, which comprises:

(a) introducing a test molecule to a system which comprises a nucleic acid comprising a nucleotide sequence in SEQ ID NOs:1-5, a substantially identical sequence thereof or a fragment of the foregoing; or introducing a test molecule to a system which comprises a protein encoded by a nucleotide sequence in SEQ ID NOs:1-5, a substantially identical sequence thereof or a fragment of the foregoing; and

(b) determining the presence or absence of an interaction between the test molecule and the nucleic acid or protein,

whereby the presence of an interaction between the test molecule and the nucleic acid or protein identifies the test molecule as a candidate therapeutic for treating osteoporosis.

34. A method for treating osteoporosis in a subject, which comprises contacting one or more cells of a subject in need thereof with a nucleic acid, wherein the nucleic acid comprises a nucleotide sequence in SEQ ID NOs:1-5, a substantially identical sequence thereof, a fragment of the foregoing, or a complementary nucleotide sequence of the foregoing; whereby contacting the one or more cells of the subject with the nucleic acid treats osteoporosis in the subject.

35. The method of claim 34, wherein the nucleic acid is RNA or PNA.

36. The method of claim 34, wherein the nucleic acid is duplex RNA.

37. A method for treating osteoporosis in a subject, which comprises contacting one or more cells of a subject in need thereof with a protein, wherein the protein is encoded by a nucleotide sequence which comprises a polynucleotide sequence in SEQ ID NOs:1-5, a substantially identical sequence thereof or a fragment of the foregoing; whereby contacting the one or more cells of the subject with the protein treats osteoporosis in the subject.

38. A method for treating osteoporosis in a subject, which comprises:
detecting the presence or absence of one or more polymorphic variations associated with low BMD in a nucleic acid sample from a subject, wherein the one or more polymorphic variation are detected in a nucleotide sequence in SEQ ID NOs:1-5, a substantially identical sequence thereof or a fragment of the foregoing; and administering an osteoporosis treatment to a subject in need thereof based upon the presence or absence of the one or more polymorphic variations in the nucleic acid sample.

39. The method of claim 38, wherein the one or more polymorphic variations are detected at one or more positions in claim 3, 6, 9, 12 or 15.

40. The method of claim 38, which further comprises determining BMD levels in the subject.

41. The method of claim 38, wherein the treatment is selected from the group consisting of administering bone-active phosphonates, bisphosphonates, calcitonin, estrogen, progestins, parathyroid hormone, estrogen and estrogen receptor modulators, sodium fluoride and vitamin D metabolites, a BMD level monitoring regimen, dietary counseling to promote a balanced diet rich in calcium and vitamin D, counseling to promote weight-bearing exercise and a healthy lifestyle with no smoking or excessive alcohol intake, and combinations of the foregoing.

42. A method for selecting a therapeutic treatment for treating osteoporosis in a subject, which comprises:

detecting the presence or absence of one or more polymorphic variations associated with low BMD in a nucleic acid sample from a subject, wherein the one or more polymorphic variation are detected in a nucleotide sequence in SEQ ID NOs:1-5, a substantially identical sequence thereof or a fragment of the foregoing; and

selecting and administering an osteoporosis treatment to a subject in need thereof based upon the presence or absence of the one or more polymorphic variations in the nucleic acid sample.

43. The method of claim 42, wherein the one or more polymorphic variations are detected at one or more positions in claim 3, 6, 9, 12 or 15.

44. The method of claim 42, wherein a therapeutic treatment is not selected based upon the presence of one or more polymorphic variations in the nucleic acid sample.

45. A method for detecting or preventing osteoporosis in a subject, which comprises:
detecting the presence or absence of one or more polymorphic variations associated with low BMD in a nucleic acid sample from a subject, wherein the polymorphic variation is detected in a nucleotide sequence in SEQ ID NOs:1-5, a substantially identical sequence thereof or a fragment of the foregoing; and
administering an osteoporosis treatment or detection procedure to a subject in need thereof based upon the presence or absence of the one or more polymorphic variations in the nucleic acid sample.

46. The method of claim 45, wherein the one or more polymorphic variations are detected at one or more positions in claim 3, 6, 9, 12 or 15.

47. The method of claim 45, wherein the osteoporosis treatment is selected from the group consisting of administering bone-active phosphonates, bisphosphonates, calcitonin, estrogen, progestins, parathyroid hormone, estrogen and estrogen receptor modulators, sodium fluoride and vitamin D metabolites, a BMD level monitoring regimen, dietary counseling to promote a balanced diet rich in calcium and vitamin D, counseling to promote weight-bearing exercise and a healthy lifestyle with no smoking or excessive alcohol intake, and combinations of the foregoing.

48. A method of targeting information for preventing or treating osteoporosis to a subject in need thereof, which comprises:

detecting the presence or absence of one or more polymorphic variations associated with low BMD in a nucleic acid sample from a subject, wherein the polymorphic variation is detected in a nucleotide sequence in SEQ ID NOs:1-5, a substantially identical sequence thereof or a fragment of the foregoing; and

directing information for preventing or treating osteoporosis to a subject in need thereof based upon the presence or absence of the one or more polymorphic variations in the nucleic acid sample.

49. The method of claim 48, wherein the one or more polymorphic variations are detected at one or more positions in claim 3, 6, 9, 12 or 15.

50. The method of claim 48, wherein the information comprises a description of an osteoporosis detection procedure or treatment.

51. The method of claim 48, wherein the treatment is selected from the group consisting of administering bone-active phosphonates, bisphosphonates, calcitonin, estrogen, progestins, parathyroid hormone, estrogen and estrogen receptor modulators, sodium fluoride and vitamin D metabolites, a BMD level monitoring regimen, dietary counseling to promote a balanced diet rich in calcium and vitamin D, counseling to promote weight-bearing exercise and a healthy lifestyle with no smoking or excessive alcohol intake, and combinations of the foregoing.

52. A composition comprising a cell from a subject having low BMD or at risk of low BMD and an antibody that specifically binds to a protein, polypeptide or peptide encoded by a nucleotide sequence identical to or 90% or more identical to a nucleotide sequence in SEQ ID NOs:1-10.

53. A composition comprising a cell from a subject having low BMD or at risk of low BMD and a RNA, DNA, PNA or ribozyme molecule comprising a nucleotide sequence identical to or 90% or more identical to a portion of a nucleotide sequence in SEQ ID NOs:1-10 or nucleotide sequence complementary to the foregoing.

54. The composition of claim 53, wherein the RNA molecule is a short inhibitory RNA molecule.

55. The method of claim 37, wherein the protein is recombinant *PROL4*.

Abstract of the Disclosure

Provided herein are methods for identifying a risk of low BMD in a subject, reagents and kits for carrying out the methods, methods for identifying candidate therapeutics for treating low BMD-related disorders, such as osteoporosis, and therapeutic and preventative methods applicable to osteoporosis. These embodiments are based upon an analysis of polymorphic variations in nucleotide sequences within the human genome.

FIGURE 1

CETP

Proximal SNPs-Discovery

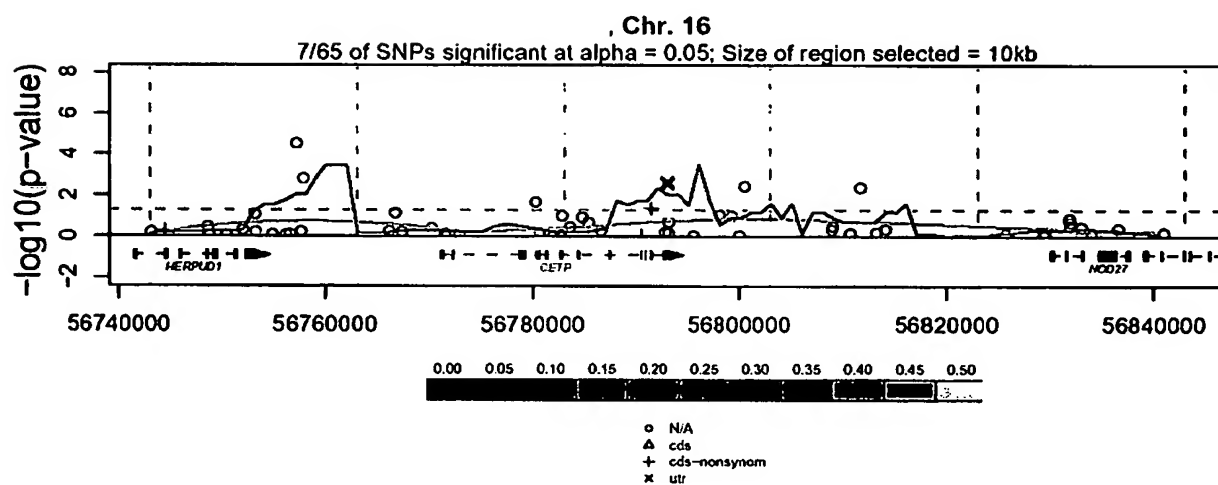


FIGURE 2

PROL4

Proximal SNPs-Discovery

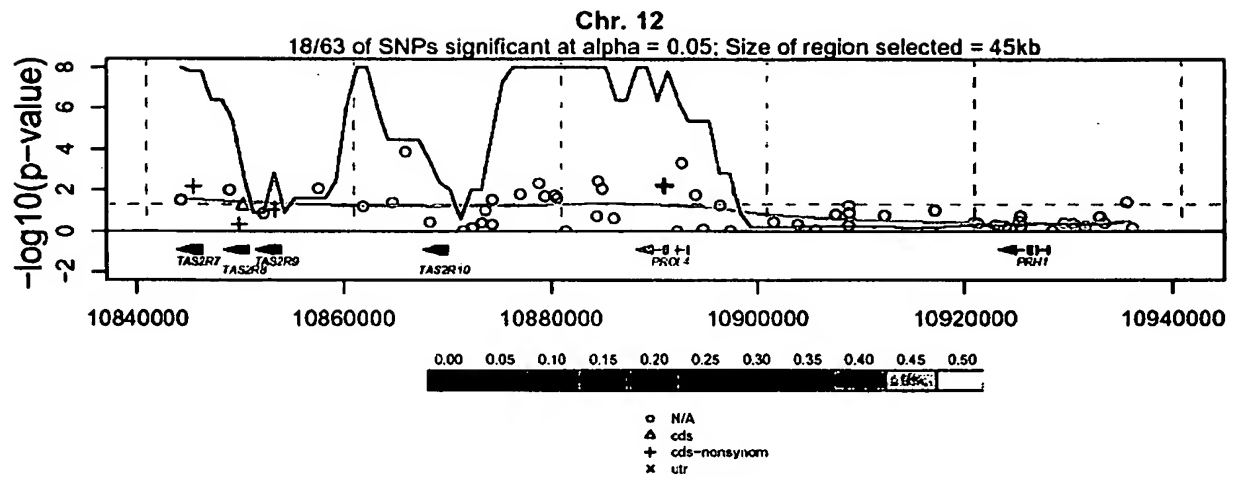


FIGURE 3
GRID2
Proximal SNPs-Discovery

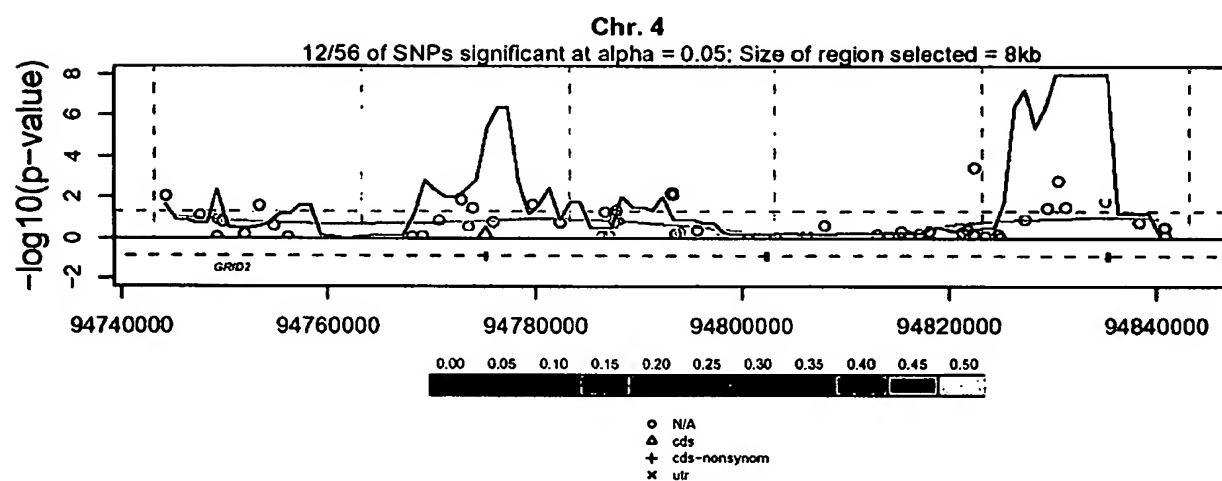


FIGURE 4

PDE4D

Proximal SNPs-Discovery

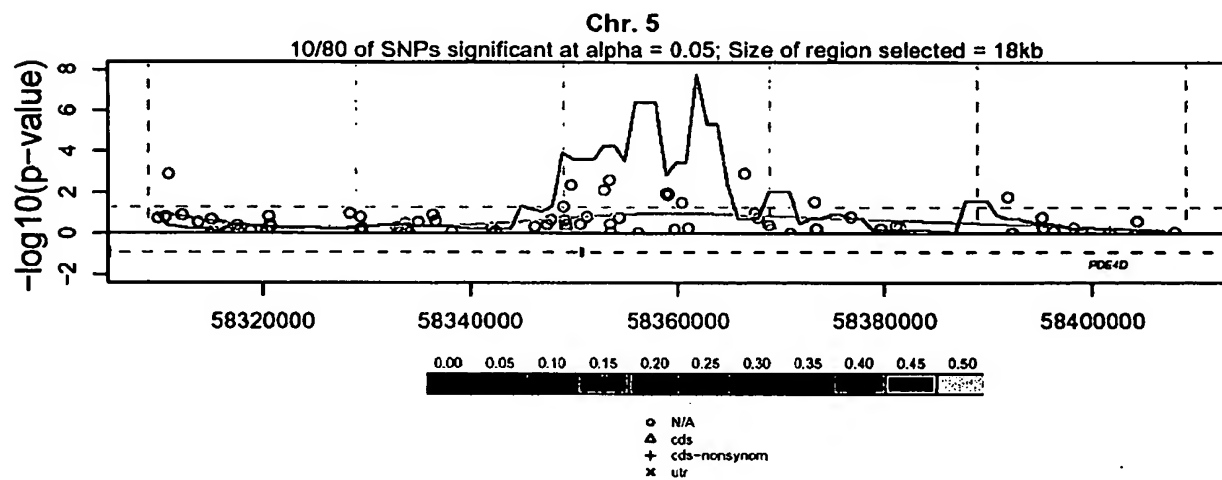


FIGURE 5
GPX3
Proximal SNPs-Discovery

